STATE OF UTAH
RADIOACTIVE WASTE
MANAGEMENT PLAN

APRIL 1994

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FOREWORD

Utah Code Title 19-3-107 (the Radiation Control Act) required the Utah Radiation Control Board to prepare a state plan for management of radioactive waste by July 1, 1993. This requirement was placed in the Code during the 1991 legislative session. The elements required to be addressed within the plan included:

(1) Estimation of radioactive waste capacity needed in the state for the next 20 years;

(2) Assessment of the state's ability to minimize waste and recycle;

(3) Evaluation of radioactive waste treatment and disposal options, as well as radioactive wastes needs and existing capacity;

(4) Evaluation of facility siting, design, and operation;

(5) Review funding alternatives for radioactive waste management; and

(6) Address other radioactive waste management concerns that the Board finds appropriate for the preservation of the public health and the environment.

This draft State of Utah Radioactive Waste Management Plan was prepared by first drafting criteria for each of the elements within the plan. At the August 27, 1993 Utah Radiation Control Board meeting, criteria were presented to the Board that would form the basis for drafting the plan. These criteria proceed each element in this draft plan. Since the August Board meeting, the staff of the Division of Radiation Control have been preparing the draft plan for presentation to the Board. A draft plan which was presented to the Utah Radiation Control Board at the November 5, 1993 and December 10, 1994 meetings was approved for public comment at the December meeting. Public hearings were held January 5, 1994 at the San Juan County Courthouse in Monticello, Utah and Salt Lake City, Utah at the Airport East Rear Building. On January 6, 1994, hearings were held at the Tooele County Courthouse, Tooele, Utah and at St. Benedict's Hospital in Ogden, Utah.

The Utah Radiation Control Board now presents this plan in finalized form to inform the citizens of the state of Utah and the Utah legislature who requested the plan about the radioactive waste issues facing Utah now and into the future.

William J. Sinclair
Executive Secretary
Utah Radiation Control Board

ELEMENT 1 (19-3-107.(2)(a)

ESTIMATE OF RADIOACTIVE WASTE CAPACITY NEEDED FOR THE NEXT 20 YEARS

- Identification of radioactive wastes types:

  Low-Level Class A stable
  Low-Level Class A unstable
  Low-Level Class B
  Low-Level Class C
  Low-Level Greater than Class C
  NORM
  NARM
  Source Materials
  Special Nuclear Materials
  Orphaned Waste
  Mixed Waste
  11(e)2 (uranium mill tailings)
  High level waste
  Transuranic

- Identification of Utah radioactive waste generators by type and disposal options for Utah generators; use of report entitled:

  State by State Assessment of Low-Level Radioactive Wastes
  Received at Commercial Disposal Sites

- Discussion of Northwest Interstate Compact On Low-Level Radioactive Waste Management and capacity of the compact site and Utah's contribution/need for capacity at that facility

- Discussion of the Utah commercial radioactive waste facility in relation to Utah generated waste disposal options

CLASSIFICATION OF RADIOACTIVE WASTE

Radioactive wastes are differentiated by the intensity of their radiation--that is, by the number of gamma rays or particles emitted per second per unit of volume. They also differ in physical form (liquid, solid, or gas), in chemical form, and in the nature of the radiation they emit. It is very important that definitions of radioactive wastes are given, because substances are managed by law and regulation according to classification. Radioactive materials fall into several categories based upon their origin, the type of material present, and their level of radioactivity. A general and broad distinction is defense waste and commercial waste.

Defense waste was first generated during World War II and the generation has continued to the present. The Department of Energy supervised the separation of plutonium and other radionuclides from reactor spent fuel. The chemical process created a residue of fission product waste. Other waste contaminated with plutonium resulted from weapons fabrication at Rocky Flats, Colorado and several other sites. Defense waste has not been generated in Utah.

Commercial waste has been produced by reactors used for electrical power, by facilities used to process reactor fuels, and by a variety of institutions and industries. There is only a small volume of commercial wastes from reprocessing because most of the fuel from power reactors has been left in the form of irradiated fuel assemblies--the spent fuel. Used fuel remains highly radioactive for years after it is removed from the reactor.

The federal government has defined a number of radioactive waste forms which are included within the defense waste and commercial waste general distinctions. The waste forms are as follows:

Spent fuel consists of irradiated fuel removed from a reactor (after three or four years in use) of defense or commercial origin. Spent fuel is highly radioactive and generates a lot of heat; it requires heavy shielding and remote handling. After spent fuel assemblies are removed from a reactor, they are submerged in water in large pools to be cooled and to protect people from their radioactivity. Most commercial spent fuel is stored in on-site pools at the nuclear power plant where the fuel was irradiated. The defense spent fuel that is not reprocessed is stored at federal facilities in Idaho and South Carolina.

High-level waste is generated by the reprocessing of either commercial spent fuel or defense production reactor fuel. Reprocessing involves the chemical separation of the uranium and plutonium from the fission products and transuranic elements in the spent fuel. High-level waste is liquid unless it has been chemically treated, in which case it may be a mixture of liquid and sludge or calcine, a dry granular material. High-level waste generates a lot of heat and requires heavy shielding to control penetrating radiation. It must be handled remotely.

Transuranic waste comes from the reprocessing of spent fuel and from the use of plutonium in the fabrication of nuclear weapons. It is defined as waste contaminated with alpha-emitting

radionuclides of atomic number greater than 92 (that is, uranium; hence the term transuranic) and half-lives greater than 20 years in concentrations greater than 100 nanocuries per gram of waste material. Transuranic waste is less intensely radioactive and generates less heat than fission products, but it normally takes a long time to decay. Radionuclides include plutonium-239, half-life 2.411 x 10^4 yr; americium-241, 432.7 yr; americium-243, 7380 yr; and curium-245, 8500 yr. Generally, little or no shielding is necessary, but some transuranic waste does require shielding or remote handling.

Low-level waste (LLW) covers a broad spectrum of radioactive materials and is classified according to hazard level. Low-level radioactive waste is best defined by what it is not. Low-level waste is not spent fuel from nuclear power plants or the resulting high-level waste from their reprocessing. It is not transuranic waste or the waste from mining and milling uranium known as "tailings." The bulk of LLW has little radioactivity, requires little or no shielding, may be handled by direct contact, and may be buried in near-surface facilities. Part of the LLW, however, has high enough radioactivity that it must be given special treatment and disposal.

Low-level wastes may be comprised of certain radioactive materials which have been specifically defined. "Source materials" are ores that contain by weight, one twentieth (1/20) of one percent (0.05 percent) or more of uranium, thorium, or any combination of uranium and thorium. They serve as the source of fissionable material. "Special nuclear materials" (SNM) are uranium enriched in the radionuclide uranium-235 or manmade fissile elements such as plutonium or uranium-233. They are special because they can be reactor fuel or weapons materials. "Byproduct materials" are radioactive materials (excluding SNM) produced by irradiation in reactors or are the tailings from the extraction of uranium from ore (uranium mill tailings are further defined later).

Low-level wastes are generated by institutions and facilities using radioactive materials. The waste comes in a variety of forms, including, but not limited to, animal carcasses, medical treatment and research materials, contaminated wiping rags, ion exchange resins, paper towels, protective clothing, hand tools, and obsolete equipment. The Nuclear Regulatory Commission (NRC) has developed a classification system for LLW upon its potential hazards and provides flexibility in the selection of one type of waste packaging as long as the requirement for a structurally stable waste form [10 CFR 61.56(b)(1)] is met.

The NRC's classification system is based on the concept of identifying wastes generally acceptable for near-surface disposal and then further characterizing this general category into more specific classes that require different levels of management to satisfy the performance objectives applicable to land burial of low-level radioactive waste. Four classes of waste have been established, based on an evaluation of the concentrations and half-lives of various radioactive materials.

These concentration limits were calculated by the NRC so that radiation doses, to an individual who inadvertently intruded onto a near-surface burial site after the institutional control period,

were acceptable. They are required for all types of disposal technology, not just the near-surface disposal (commonly called "shallow land burial") system assumed by the NRC. The four classes of radioactive waste for disposal purposes are:

Class A wastes are wastes that have no requirements to maintain structural stability but must be segregated from other waste classes at the disposal site. The requirement to segregate this waste is based upon the NRC shallow-land burial assumption that the deterioration of these wastes, if mixed with higher activity waste, could lead to "failure of the system and permit water to penetrate the disposal unit and cause problems with the higher activity waste." [10 CFR 61.7(b)(3)] If Class A wastes are made stable, then they may be placed in the same disposal units as Class B and C waste.

Class A wastes are characterized by their low concentrations of long-lived radionuclides and concentrations of short-lived radionuclides that will decay to acceptable levels within an assumed 100-year institutional control period after facility closure.

Class B wastes are the next level of wastes which could represent a potential hazard to an inadvertent intruder without additional protective measures, since they contain higher levels of short-lived and long-lived radionuclides. They must meet the NRC's stability requirements so that the waste forms or containers can "maintain gross physical properties and identity, over 300 years," [10 CFR 61.7(b)(2)] thus limiting the potential exposure to an inadvertent intruder.

Class C wastes are wastes that, due to their greater concentrations of long-lived or short-lived radionuclides, have to meet waste form requirements to ensure stability and must be disposed of in a way to protect the inadvertent intruder for a longer period of time. These wastes must meet the stability requirements for form or container (300 years) and must be "disposed of so that the top of the waste is a minimum of five meters below the top surface of the cover (of the disposal unit) or must be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years." [10 CFR 61.52(a)(2)]

Greater than Class C (GTCC) wastes are wastes whose concentrations of radionuclides generally make them unacceptable for shallow-land burial. GTCC wastes come under the direct responsibility of the Department of Energy and are generally required to be disposed of in a geologic repository.

Uranium mill tailings are the earthen residues, usually in the form of fine sand, that remain after mining and extraction of uranium from ores. Tailings are produced in very large volumes and contain low concentrations of naturally occurring radioactive materials, including thorium-230 and radium-226, which decays to emit the radioactive gas radon-222.

NARM waste comes from Naturally Occurring and Accelerator Produced radioactive materials. NARM waste can be classified in two ways. The first is discrete NARM material produced in a cyclotron or other type of accelerator which is small in volume and high in activity. Examples of this type of NARM waste include radium needles used in medicine, and water filters from

processing radium-contaminated ground waters. The second type of NARM waste is diffuse material which is generally lower activity radium-contaminated soil at locations where radium was used in manufacturing or where natural deposits of radium exist, or materials containing concentrations of radium or other naturally-occurring radionuclides.

Naturally occurring radioactive material (NORM) is radioactive material that has a natural source. It is a subcategory of NARM waste. Examples of NORM include radium-226 in phosphogypsum for agricultural use, radium-226 in pipe scale from oil or gas production, potassium-40 in potash fertilizer, and uranium or thorium in materials used for building and highway construction.

Mixed wastes are those wastes containing both hazardous chemicals and radioactive substances. Hazardous wastes are defined as materials that are toxic, corrosive, inflammable, or explosive by the Environmental Protection Agency (EPA) [Subpart D of 40 CFR 261 and Subpart C of 40 CFR 261]. They contain specific elements such as lead and mercury, pesticides such as DDT and parathion, and cancer-producing compounds such as chlorinated solvents and dioxin.

The disposal of hazardous wastes is regulated by the EPA under the Resource Conservation and Recovery Act (RCRA) while radioactive wastes are controlled by the Nuclear Regulatory Commission under the Atomic Energy Act. Therefore, it has been necessary to establish consistent dual rules by agreement between agencies.

Orphan wastes are not specifically defined by any federal agency, but are generally regarded as wastes for which a disposal facility does not yet exist. Transuranic and GTCC waste in the form of sealed sources have been referred to as orphan waste.

Below regulatory concern wastes (BRC) are those low-level wastes which contain such small quantities of radioactive material that the waste may be disposed of without regard to its radioactivity.

The NRC was directed by the Low-Level Radioactive Waste Policy Amendments Act of 1985 to develop criteria and procedures for acting on petitions "to exempt specific radioactive waste streams from regulation...due to the presence of radionuclides...in sufficiently low concentrations or quantities as to be below regulatory concern." An NRC policy statement on BRC waste was issued on August 29, 1986. It described the kind of information petitioners should file to allow timely NRC review of petitions for rulemaking to exempt specific waste streams from disposal in a licensed LLW disposal facility.

Later the NRC issued a 1990 BRC policy statement to establish a consistent risk framework for making regulatory exemption decisions across the broad spectrum of activities regulated by the agency. In reaction to public concern about the 1990 policy, the Commission announced in February 1991, the initiation of a consensus-building process to clarify differences and work toward resolution of issues related to implementation of the policy with regard to waste disposal. In July 1991, it was necessary to place a complete moratorium on implementation of the 1990

policy. Due to the difficulty of obtaining the participation of all affected interests in the process, the NRC indefinitely extended the moratorium on the implementation of the policy in December 1991. Later the Energy Policy Act of 1992 revoked the 1986 and 1990 BRC policy statements.

The Energy Policy Act did not, however, revoke the Commission's authority under the Atomic Energy Act to exempt classes of radioactive materials from regulatory control. The NRC will therefore continue to address individual exemption requests using criteria and guidance in existence prior to the 1990 policy statement. It will also continue to use existing general procedures for the processing of petitions for rulemaking to handle exemption requests.

RADIOACTIVE WASTE DISPOSAL OPTIONS AND GENERATION

The management of LLW disposal is in a state of evolution. Early disposal practices were inadequate, stricter regulatory controls have been imposed, and designs of facilities other than shallow land burial have been proposed. In 1963 the first commercial disposal site was established, and by 1971 there were six operating facilities nationally. At all of the sites, the practice was to dig a trench, fill it with drums and boxes of waste, replace the excavated earth, apply some compaction, and form an earthen cap above the trench. As such, they were very much the same as sanitary landfills.

There has been mixed success with this disposal technique. Three of the commercial sites developed leaks and were closed, while the remaining three have operated in an acceptable manner. In general, the principal causes of site failure have involved water accumulating in the trenches which became mixed with the buried radioactive materials and eventually ran over the top of the trench or seeped into ground water. The Nuclear Regulatory Commission has attempted to correct past problems of the shallow land burial approach by establishing new and more stringent siting and operation regulations. A major objective has been to keep water away from the waste. The trenches at all of the sites have been stabilized and the earthen caps restored. Each is being monitored to ensure that the corrective actions remain effective.

Presently, there are two commercial LLW disposal sites in operation, Richland, Washington and Barnwell, South Carolina. On December 31, 1992, the Beatty, Nevada site stopped receiving LLW for disposal altogether and the Richland, Washington site restricted the LLW received for disposal to the Northwest and Rocky Mountain compact states. The Barnwell, South Carolina disposal site continues to receive LLW for disposal by the member states of the Southeast compact and those compact states that have contracts with the Southeast commission. The Barnwell site is scheduled for closure to all "out-of-region" generators in July 1994. At that time, states that do not have access to an operational disposal site will have to store their LLW until a location is identified and a facility is constructed.

There are 220 radioactive material licensees in Utah. Of the radioactive material licensees which generate LLW, some produce LLW that must be managed by disposal at a licensed LLW

disposal facility. A number of other licensees generate waste that is managed by a variety of methods described in Element 3 of the Plan, and others do not generate any waste.

Each year, the National Low-Level Waste Management Program of the U.S. Department of Energy publishes a state-by-state assessment report. The report summarizes national and state specific LLW data on radioactive waste commercially disposed in the United States. The data are categorized according to disposal site, generator category, waste class, volumes, and radionuclide activity.

There are five waste generator categories identified as Academic, Government, Industrial, Medical and Utility. The utility category includes commercial nuclear power reactors, but this category does not apply to any radioactive material licensees in Utah. The academic category includes university hospitals and university medical and nonmedical research facilities. Medical generators are comprised of hospitals and clinics, research facilities, and private medical offices. The industrial category encompasses private entities such as research and development companies, manufacturers, nondestructive testing companies, mining facilities, and radiopharmaceutical manufacturers. The government category includes state and federal agencies.

Specific data has been extracted from the annual reports and is provided to characterize disposal activities of Utah radioactive material licensees. U.S. data for total LLW disposal at the three commercial disposal sites in 1992 is shown in Table 1.1 and Figure 1-A. This table and figure

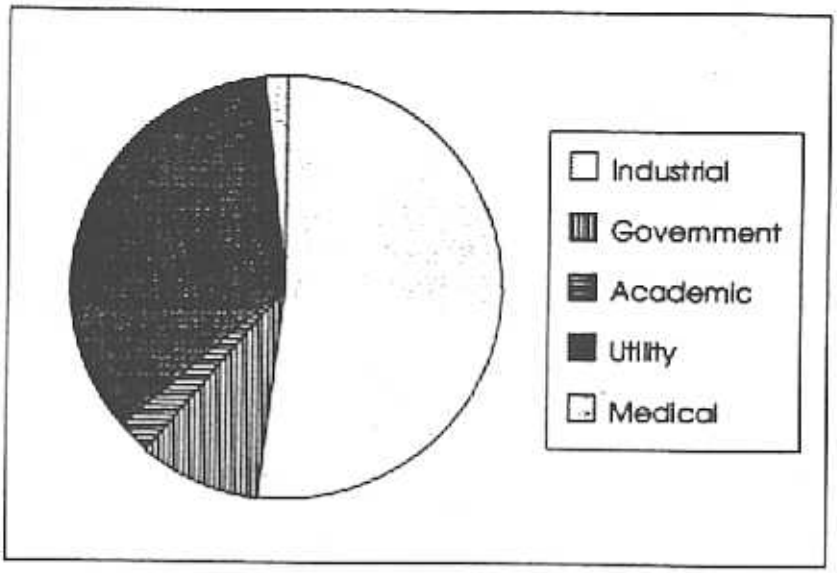
TABLE 1.1
1992 TOTAL WASTE RECEIVED AT THREE COMMERCIAL DISPOSAL SITES

Generator Category	Volume (cubic feet)	Activity (curies)
Academic	44,322.34	1,724.39
Government	158,186.17	40,780.08
Industrial	908,451.86	100,089.80
Medical	26,251.32	397.80
Utility	606,066.85	857,110.38
TOTAL	**1,743,278.54**	**1,000,102.45**

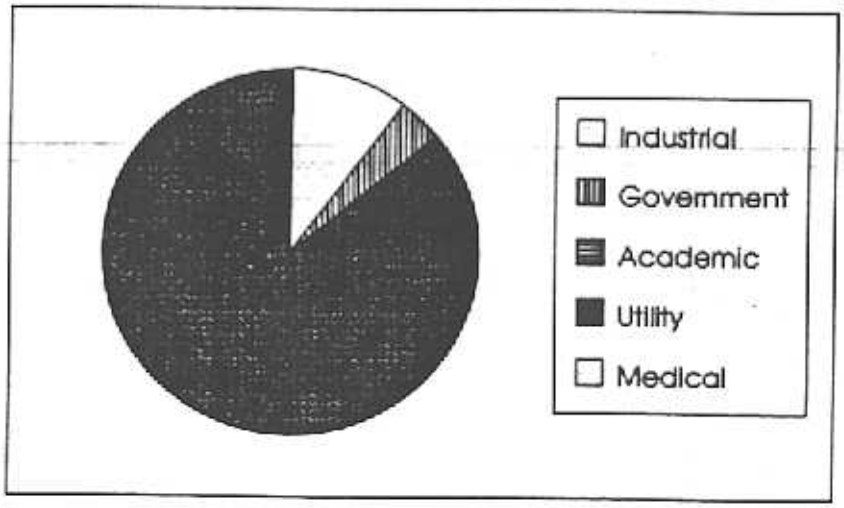
Source: U.S. Department of Energy, National Low-Level Waste Program. 1992 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites, DOE/LLW-181, Idaho Falls, ID, September 1993.

FIGURE 1-A
1992 NATIONAL TOTAL LLW RECEIVED AT THREE COMMERCIAL DISPOSAL SITES BY GENERATOR CATEGORY BY VOLUME AND ACTIVITY

VOLUME	
Industrial	52.10%
Government	9.10%
Academic	2.50%
Utility	34.80%
Medical	1.50%



ACTIVITY	
Industrial	10.00%
Government	4.10%
Academic	0.20%
Utility	85.70%
Medical	<0.1%



Source:
U.S. Department of Energy, National Low-Level Waste Program. 1992 State-by-State Assessment of Low-Level Radioactive Wastes Received At Commercial Disposal Sites, DOE/LLW-181, Idaho Falls, ID, September 1993.

show that 52.1% of the total LLW volume produced in the country originated from the industrial category of radioactive materials users, as compared to 94.5% of the LLW produced in Utah in 1992 (Table 1.2). Only 4.1% of the total radionuclide activity shipped for disposal nationally resulted from the government category of waste produced, as compared to 99.1% of the activity produced in Utah in 1992.

In addition, nationally, 34.8% of the volume and 85.7% of the activity came from utility waste. It is not possible to compare these data with figures from Utah, since there are no commercial nuclear power reactors operating in the state. The information is instructive in that it gives perspective on the relationship evident between Utah LLW shipments and the shipments for the rest of the Nation.

In 1991 and 1992, the volumes of LLW shipped were 7,838.83 and 5,380.18 cubic feet, respectively. The 1991 and 1992, volumes ranked Utah as the 31st and 34th largest producer in the country those years, respectively, in terms of LLW accepted at licensed disposal facilities. A summary of the volumes and radionuclide activity shipped from 1990 through 1992 is provided in Table 1.2.

TABLE 1.2
SUMMARY OF UTAH LLW SHIPPED FOR DISPOSAL

Waste Generator Category	Volume (cubic feet)			Activity (curies)		
	1990	1991	1992	1990	1991	1992
Academic	753.86	537.30	193.30	0.91	1.72	0.14
Government	0	832.00	101.40	0	60.45	106.98
Industrial	4,571.13	6,469.53	5,085.48	0.36	0.30	0.84
Medical	13.13	0	0	0.13	0	0
TOTAL	**5,338.12**	**7,838.83**	**5,380.18**	**1.40**	**62.47**	**107.96**

Source: U.S. Department of Energy, National Low-Level Waste Program. 1992 State-by-State Assessment of Low-Level Radioactive Wastes Received At Commercial Disposal Sites, DOE/LLW-132, Idaho Falls, ID, September 1991; DOE/LLW-152, Idaho Falls, ID, September 1992; DOE/LLW-181, Idaho Falls, ID, September 1993.

Data for Utah LLW generators indicate that Class A waste constituted all of the waste which was shipped directly to commercial disposal sites.

Information maintained by the Northwest Interstate Compact on Low-Level Waste Management shows that as of August 17, 1993, there are 14 Utah licensees who hold permits for LLW disposal. The permit holders and their projected volume of LLW are listed in Table 1.3.

TABLE 1.3
UTAH LLW GENERATORS AND PROJECTED LLW VOLUME

Generator	Projected LLW Volume (cubic feet)
Agridyne Technologies Inc.	5
Allied Clinical Laboratories	140
ARUP, Inc.	10
Brigham Young University	40
DataChem Laboratories	21
IOMED, Inc.	75
NPS Pharmaceuticals, Inc.	16
Theratech, Inc.	30
Thiokol Corporation	50
U.S. Bureau of Mines	14
University of Utah	150
Utah State University	500
VA Medical Center	90
Westinghouse Electric Corp.	6,000

The data listed in Table 1.3 shows that one licensee is projected to account for 84% of the volume of waste shipped from Utah. This is consistent with the volumes of waste ascribed to the Industrial category in 1990 and 1991 (Table 1.1).

Some radioactive material licensees produce low-level wastes whose radioactivity decays to minuscule amounts in relatively short periods of time (from minutes to a few years). This waste is generally stored on-site within the licensee's facilities so that this decay process can occur under controlled conditions (called decay-in-storage), and the waste involved does not require disposal in a LLW disposal facility.

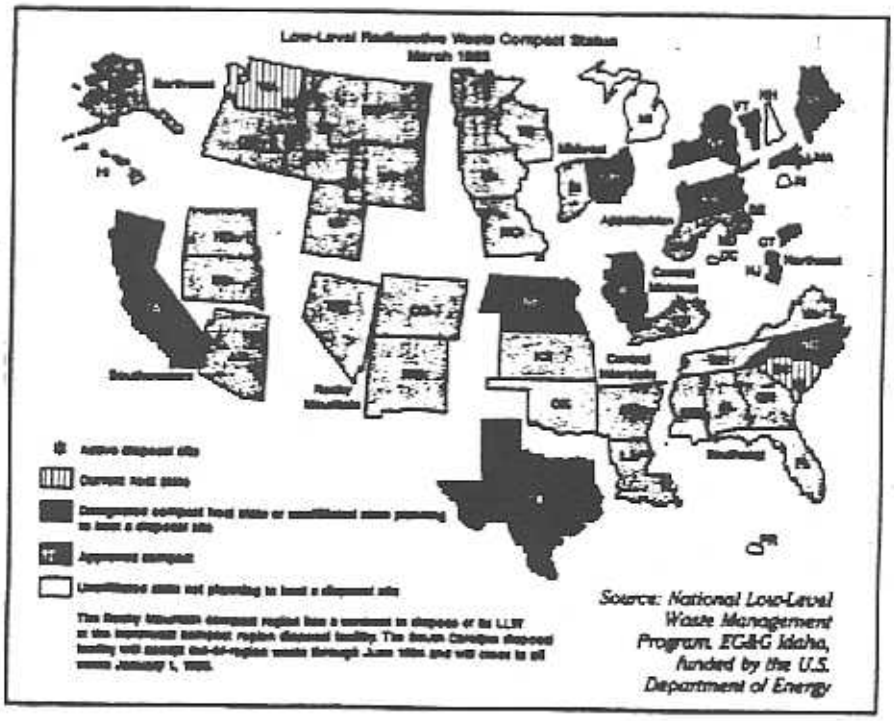
NORTHWEST INTERSTATE COMPACT ON LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

In 1980, Congress passed the Low-Level Radioactive Waste Policy Act. The Act established major national policies by making each state responsible for managing and disposing of its own LLW. To meet this responsibility, it encouraged the states to form regional groupings through interstate agreements, called compacts, so as to cooperate in managing and disposing of LLW. Compacts are legally binding agreements whereby the member states determine what facilities are needed, which state will serve as host for a LLW burial facility, and for how long. Congress added an incentive to states to work together, stipulating that any regional compact approved by Congress could restrict waste from outside the compact after January 1, 1986.

By 1984, it became apparent that the states were not moving fast enough to meet the deadline for developing new LLW burial facilities. In December 1985, Congress passed the Low-Level Radioactive Waste Policy Amendments Act of 1985, which extended out-of-region access to the three existing disposal sites through 1992. The Amendments Act of 1985, was a compromise between those states hosting a LLW burial facility and the other states.

The governors of each state were given the responsibility for implementing the Low-Level Radioactive Waste Policy Act of 1980 and the Amendments Act of 1985. A number of states have reached agreement to form regional compacts, but some states remain unaffiliated. They are either planning to host a disposal site or do not plan to host a disposal site. Figure 1-B shows the LLW compact status as of March 1993.

FIGURE 1-B



The Northwest Interstate Compact on Low-Level Radioactive Waste Management is comprised of the states of Alaska, Hawaii, Idaho, Montana, Oregon, Utah, Washington, and Wyoming. The purpose of the Compact, as described in 19-3-201 of the Environmental Quality Code, is to:

1. Protect the health and safety of the citizens of the compact states from the hazards of low-level radioactive waste;

2. Provide economical management of low-level radioactive waste through cooperation of the states in minimizing the amount of handling and transportation required to dispose of low-level waste and through cooperation of the states in providing facilities that serve the region; and

3. Share the responsibility of radioactive low-level waste management among the compact states.

As defined by the Radiation Control Act, low-level waste means waste material which contains radionuclides emitting primarily beta or gamma radiation, or both, in concentrations or quantities which exceed applicable federal or state standards for unrestricted release.
Low-level waste does not include waste containing more than ten (10) nanocuries of transuranic contaminants per gram of material, spent reactor fuel, or material classified as either high-level waste or waste which is unsuited for disposal by near-surface burial.

The designated facility for the Northwest Interstate Compact is the site at Richland, Washington operated by U.S. Ecology. Any low-level waste generated within the borders of the compact states must be sent to the Washington facility.

The Governor of each compact state designates one state official as the person responsible for administration of the compact. In the past, the designated state official has been the Deputy Director of the Department of Environmental Quality (DEQ), the State Science Advisor, and more recently, the Director of the Division of Radiation Control. The officials so designated shall together comprise the Northwest Low-Level Waste Compact Committee [Utah Code Ann. 19-3-204(1)].

The following occurs under the Compact:

1. The committee meets as required to consider matters arising under the Compact.

2. The party states must inform the Compact committee of existing regulations concerning low-level waste management in their states and afford all parties a reasonable opportunity to review and comment upon any proposed modifications in the regulations.

3. The Compact committee may enter into arrangements with states, provinces, individual generators, or regional compact entities outside the compact for access to facilities on terms and conditions that the committee considers appropriate.

4. A two-thirds vote of all Compact members is required, including the affirmative vote of the member of any party state in which a facility affected by the arrangement is located, for the committee to enter into an arrangement.

Utah became a member of the Compact through an executive order issued by Governor Scott Matheson on June 16, 1981, and legislative approval (See Utah Code Ann. 19-3-201 et seq.).

If issues come before the Compact, the Executive Secretary advises the Utah Board of Radiation of those issues in a timely manner and the Board's recommendations on what action should be taken will be considered by the State Compact representative along with other input (e.g. Governor, Executive Director of DEQ).

As mentioned previously, the LLW disposal facility for the Northwest Compact is sited in Richland, Washington and is operated by U.S. Ecology. The facility opened in 1965, and is not scheduled for closure until 2063. The disposal site operator leased 100 acres from the state of Washington and, to date, has utilized approximately 30 of the 100 acres.

From the commencement of operations through December 31, 1992, the site operator has buried 12.3×10^6 cubic feet of LLW. The overwhelming majority, approximately 98%, of the LLW is Class A waste. The LLW and the necessary earthen backfill material has consumed 26×10^6 cubic feet of the design capacity. It is projected that 45.65×10^6 cubic feet is the gross volume remaining, which indicates that approximately 45 to 50% of the initial gross volume has been utilized.

Since January of 1993, the volume of radioactive waste received at the facility has decreased. This decline is believed to be the result of an increase in disposal costs and a restriction of the LLW received for disposal to the Northwest and the Rocky Mountain Compact states. Table 1.4 lists the volume of waste received at commercial disposal sites for member states of the Northwest Compact for each of the past five years.

Table 1.4 shows that the portion of Utah LLW shipped to commercial disposal sites is small. On average, the portion of LLW from Utah for the past five years is 4.5% of the total volume shipped to commercial facilities. Since the major fraction of LLW from Utah is Class A waste and since Utah contributes a small portion of the waste received at commercial disposal sites, it is apparent that there is sufficient disposal capacity for LLW from Utah for the next 20 years and possibly longer.

TABLE 1.4
LLW SHIPPED BY NORTHWEST COMPACT STATES
TO COMMERCIAL DISPOSAL SITES

Volume (cubic feet)					
State	1988	1989	1990	1991	1992
Alaska	3.70	10.59	33.51	69.82	143.29
Hawaii	3,943.45	6,203.82	4,738.86	2,958.44	2,931.86
Idaho	51.23	137.99	40.06	29.50	50.91
Montana	14.33	107.01	195.00	53.40	139.71
Oregon	83,796.41	75,907.48	59,436.32	80,268.87	14,7681.60
UTAH	**4,672.31**	**6,299.31**	**5,338.12**	**7,838.83**	**5,380.18**
Washington	35,895.82	26,408.54	26,141.09	46,715.15	79,289.90
Wyoming	0	0	0	0	2.90
TOTAL	128,377.25	115,074.74	95,942.96	137,934.01	235,620.33
Utah percent of total	3.6%	5.5%	5.6%	5.7%	2.6%

UTAH'S COMMERCIAL LLW FACILITY

Envirocare of Utah, Inc. is a radioactive waste disposal facility located approximately 85 miles west of Salt Lake City, south of the Clive exit of Interstate 80. The Envirocare site comprises a section of land (640 acres). Originally, the site was used to dispose of the Vitro uranium mill tailings located in South Salt Lake. The Vitro pile occupies a portion of the Envirocare facility.

Envirocare is designed to handle bulky, sandy, soil-like waste with low-concentration of radioactivity. Radiological risks have been modeled and the facility has been designed to meet specific radiation dose criteria for the occupational worker and members of the public. The radionuclides and concentrations allowed to insure the required level of protection were defined in a report prepared by Rogers & Associates Engineering Corporation, Murray, Utah.

Envirocare is currently licensed and/or permitted to receive the following LLW:

- Source, byproduct, and special nuclear material within the Class A low-level waste classification

- Naturally Occurring and Accelerator Produced Radioactive Material (NARM)

- Mixed waste (hazardous waste mixed with radioactive waste)

Envirocare has applied to the Nuclear Regulatory Commission (NRC) for a license to dispose of uranium and thorium byproduct material [as defined by 11e.(2) of the Atomic Energy Act of 1954, as amended]. A final Environmental Impact Statement and Safety Evaluation Report have already been issued by NRC. The NRC issued the license to dispose of uranium and thorium byproduct material [as defined by 11e.(2)] on November 19, 1993.

The Envirocare site is comprised of landfill cells and storage areas that receive LLW in bulk. These distinct areas are:

- Low-level waste and NORM storage and disposal areas (in operation)

- Mixed waste storage and disposal area (in operation)

- 11e.(2) disposal area (not yet licensed)

The Envirocare facility is primarily regulated by the Division of Radiation Control (DRC), Utah Department of Environmental Quality through a Radioactive Material License. Other agencies with permits or licenses issued to Envirocare include the Division of Solid and Hazardous Waste [DSHW] (mixed waste disposal cell permit), Division of Water Quality [DWQ] (groundwater discharge permit), Division of Air Quality [DAQ] (air quality permit), and the NRC (11e.(2) disposal cell).

Envirocare is required to inform the regulating agencies of changes in operations and/or apply for modifications or amendments for new changes. Examples of such changes currently being considered or recently approved follow:

- Modification for hazardous waste treatment (also requires a radioactive material license amendment)

- Amendment for receipt of mobile radionuclides (also requires a modification to the Groundwater Discharge permit)

Modifications and license amendments often require issuance of notices to individuals on a mailing list or to the newspaper. The changes may also involve public meetings and/or hearings, and issuance of public participation documents. Information relating to such modifications/amendments are normally presented before Utah Department of Environmental

Quality statutory boards (the Utah Radiation Control Board and the Utah Solid and Hazardous Waste Control Board).

Envirocare is also regulated by the Department of Environmental Quality. DRC maintains full-time presence at the site at times of operation. The DSHW is also at the Envirocare site on a routine basis during mixed waste handling or monitoring activities. Oversight of DEQ is provided by the Environmental Protection Agency (for DSHW and DWQ) and the Nuclear Regulatory Commission (for DRC).

Envirocare receives approximately 150,000 to 200,000 tons of material annually, mostly from out of state sources. The majority of the LLW results from federal remediation projects. The State of Utah assesses a fee from Envirocare of $2.25 per ton for radioactive waste and $28 per ton for mixed waste. The fees are used to fund radioactive waste disposal supervision by DEQ agencies.

Since the Northwest Interstate Compact has the responsibility under the Low-Level Waste Policy Amendments Act of 1985, to assure compliance with the process set forth thereunder, the Compact approved a Resolution and Order on December 18, 1991, which was later revised on May 28, 1992. It was recognized by the Compact that the Envirocare facility serves an important national purpose in accepting for storage and disposal bulk, large volume media slightly contaminated with very low concentrations of radioactivity. To fulfill its obligations, the Compact resolved and ordered the following:

1. Mixed waste, as defined in federal or state law is allowed access to the Envirocare facility.

2. Large volume, non-reactor, bulk media from a single site, slightly contaminated with LLW of the following kinds: soils, process sludge, and decontamination, decommissioning, construction and demolition rubble is allowed access to the Envirocare facility.

3. While the Compact generally approves the arrangements to allow disposal of the wastes described above at the Envirocare facility, in accordance with Article V of the Compact, Utah retains the right to approve of each disposal arrangement before the waste is allowed access to the Envirocare facility.

4. All federal and state environmental laws and regulations shall be complied with by Envirocare and the Compact has no authority and assumes no responsibility for the licensing and operation of the Envirocare facility.

5. Except as approved by the Northwest Interstate Compact, no LLW shall be allowed access to the Envirocare facility from any state denied access to the sited states' LLW disposal facility due to a failure to meet milestones established by Congress.

6. Envirocare shall provide to the Compact Executive Director a record of all shipments with specific information detailed within the record.

7. The Northwest Interstate Compact retains the right to modify or rescind the authorization at any time.

The resolution and order described above and the Utah Radioactive Material License for the Envirocare facility help to assure that requirements of Low-Level Radioactive Waste Policy Act of 1980, and the Amendments Act of 1985, are met in an appropriate manner.

ELEMENT 2 (19-3-107(2)(b)

ASSESSMENT OF STATE'S ABILITY TO MINIMIZE WASTE AND RECYCLE

- Identification of reprocessing opportunities for source materials for Utah generators

- Identification and discussion of technology improvements (changes in state of the art) that result in waste minimization/elimination

  Acknowledgement of less generation of radioactive waste:

  •Generators producing less waste (disposal costs)
  •No nuclear power plants licensed in the United States in the past ten years
  •No on-going uranium production
  •Defense use has been reduced
  •Should indicate that this could change over time, e.g. need for nuclear power is recognized)

- Discussion of minimization opportunities for radioactive wastes

  Supercompaction (volume reduction)
  Incineration (volume reduction)
  Decay-in-storage (radioactive to solid waste over a period of time)
  Dispose of de minimus quantities in the sewer system (dilution)
  Vent de minimus amounts to the atmosphere (dilution)

  NOTE: The following is a summary of information from The Health Physics Society Journal, "Radioactive Waste Management at a Large University and Medical Research Complex"

  •Selection of liquid scintillation cocktail (LSC) with consideration of laboratory and environmental safety

  •Reclaim liquids (vial crushers)

  •Reuse of glassware that can be washed in a dishwasher and reused; or use of small plastic containers or tubes that can be incinerated after decay-in-storage

  •Use of Conference of Radiation Control Program Directors (CRCPD) national registry of firms that recycle radioactive materials from sources having useful quantities

  •Switching from laboratory absorbent pads "diapers" to a thin plastic backed bench liner in multiple layers. A larger runner (liner) is first placed over the bench top, and it is

covered with smaller sections in the experimental area. Only the smaller top liner needs disposal

•Segregation of known contaminated wastes and suspected contaminated waste. Suspected uncontaminated wastes are surveyed with appropriate instrument for presence of radioactivity

•Source reduction - substitute short-lived material

•Modification of procedures to reduce contaminated wastes

•Keep down contamination

•Clean contaminated items and dispose of as clean

•Concentrate on ion exchange, charcoal absorption, evaporation

•Education of licensees in waste reduction methodologies

LOW-LEVEL WASTE MANAGEMENT PLAN WASTE MINIMIZATION AND RECYCLING

The federal Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA), directs the U.S. Department of Energy (DOE), as the lead federal low-level radioactive waste (LLW) management agency, to develop methods to reduce the amount of LLW generated by its various research laboratories and by commercial users of radioactive materials. To implement this order, DOE is providing technical assistance on Source and Waste Volume Management (S/WVM) policies and procedures to states who can, in turn, educate their LLW generators.

The concept of waste minimization has gained momentum among LLW generators ever since the passage of the federal LLW Policy Act in 1980, which transfers LLW management responsibility to the states and sets deadlines for the development of state and regional LLW disposal facilities. In addition, ever-increasing cost of waste treatment, storage, transportation, and disposal have had a significant impact on volume reduction. Waste processing costs include expenditures for labor, equipment, supplies, and materials, which have all risen dramatically in the past decade. Transportation expenses are affected by rising fuel prices and changing requirements for packaging LLW to ensure safety in transit.

Another reason for the move to waste minimization is the problem of dealing with mixed waste. Stringent requirements adopted by EPA in response to the 1984 amendments to the federal Resource Conservation Recovery Act (RCRA), meant no disposal has been available for mixed waste since that time. Generators, therefore, have turned to various S/WVM techniques to avoid generating mixed waste, or to treat it and destroy the hazardous chemical properties so that the waste can be disposed of as LLW.

Minimizing the amount of radioactivity in LLW prior to its generation by various methods is called "source minimization." Reducing the volume of LLW after its generation through various treatment techniques is called " volume minimization." Both concepts are among the principal goals of this State Radioactive Waste Management Plan.

Source Minimization: "minimizing the volume of radioactivity of LLW prior to its generation by such methods as: (1) avoiding unnecessary contamination of items during the use of radioactive materials; (2) carefully segregating radioactive waste from non-radioactive trash; or (3) substitution of non-radioactive isotopes or radioisotopes with shorter half-lives where practicable."

Storage-For-Decay: " a procedure in which LLW with a relatively short half-life is held for natural radioactive decay in compliance with applicable federal and state regulations."

Treatment: " any method, technique, or process, including source minimization, volume minimization and storage for decay, designed to change the physical, radioactive, chemical or

biological characteristics or composition of LLW in order to render such waste safer for management, amenable for recovery, convertible to another usable material or reduced in volume."

Volume Minimization: "treatment of LLW after its generation in order to minimize the physical dimensions of the waste and the space required for disposal. The details of waste capacity are described in Element 1.

While source and volume minimization is a beneficial objective, there are potential negative impacts associated with this concept. For example:

- making a process change to result in less radioactive materials use can result in increased chemical toxicity if the process has substituted toxic chemicals for radioactive materials. The hazards associated with toxic chemical waste can be far greater than those associated with LLW.

- reducing the volume of waste for disposal can result in higher average occupational radiation dose rates to the employees of the waste generator or the employees of the disposal facility. This is due to the fact that volume reduction methods, such as incineration or compaction, do not reduce the total radionuclide curie content of the waste; instead, they concentrate the radioactivity in smaller packages. Depending upon how the waste is packaged, the surface radiation dose rate could increase. In addition, extra waste handling necessary for volume reducing treatments can increase occupational exposure.

As radioactive materials users consider new S/WVM techniques, it will be important for them to evaluate the relative hazard potentials of alternative waste forms, to improve waste handling practices by employees, and to provide training and better personnel radiation shielding for their radiation workers' protection.

SOURCE AND WASTE VOLUME MINIMIZATION PRACTICES

The most frequently-practiced minimization methods are those involving volume reduction. From the simplest volume reduction example of storing for decay LLW which contains short half-life material, to complicated volume reduction methods such as chemical regeneration for the treatment of spent ion exchange resins. Users of radioactive materials have more successful experience with volume reduction techniques than they do with source reduction methodologies.

However, radioactive materials licensees need to incorporate all methods possible to avoid generating the waste as well as minimizing the volumes produced. There are societal benefits to avoiding LLW generation, as well as economic benefits to the generator. For society, less waste produced means less waste requiring disposal, whether or not the waste is further volume-

reduced. Less waste means reduced chances of harm to public health or the environment, and less burden on the public to pay for costly mitigation, decontamination and decommissioning in the future.

For the generator of LLW, reducing the sources of waste means less handling and packaging, more space available for waste storage, and reduced costs for disposal.

A generator's S/WVM effort should focus on four areas:

(1) Administrative policies and procedures,

(2) Designs and engineering/equipment,

(3) Operation and maintenance, and

(4) Decontamination and decommissioning.

ADMINISTRATIVE POLICIES AND PROCEDURES

Administrative efforts to accomplish S/WVM involve both the technical systems and the human employee organization of the radioactive materials user. They encompass every phase of company activity, from construction (layout and "zoning" control) to waste-handling during company operation, to future decision-making.

Administration controls should begin with a clear policy statement in support of source reduction. The policy should be issued form the chief executive officer and include specific goals and implementation strategies for Radiation Safety Officer or department managers and subordinate workers.

Some areas where administrative controls can be effective include:

Contamination Control: Administrative policies and procedures to prevent radiation from contamination non-radioactive equipment and materials involve setting accurate guidelines, analyzing recorded data, and involving the appropriate personnel. These are accomplished through radiation control zoning and waste-handling practices.

Regulations of the NRC govern the areas in a company or institution where radioactive materials can be used, the dose limits allowed in such areas and the "control zones" (e.g., access points to radiation allow for decontamination as workers leave radiation areas). [10 CFR Part 20]. The areas designated for control zones can affect the generation of LLW, by ensuring that workers are decontaminated and that they leave contaminated tools behind, before moving to another area of the plant.

Distinguishing between areas of potential high- and low-contamination is another way of administratively providing contamination control. Personnel monitoring equipment that measures the radiation dosage of each worker, and use of protective clothing may vary, depending upon need in the high- and low-contamination areas.

Waste-Handling: Sloppy or inappropriate waste-handling practices can produce LLW. Administrative policies and procedures should be developed to require workers who handle waste to be responsible for preparing the paperwork required for storage or disposal procedures.

Materials Segregation: Because most radioactive materials users produce several different types of waste steams, the segregation of radioactive materials prior to their generating waste will help reduce LLW waste. Administrative procedures can ensure proper segregation.

Storage For Decay: A policy to ensure that all short-lived radionuclides are stored for decay on-site, rather than shipped off-site for disposal, should be published for all employees, and written reminders should be routinely distributed.

Training: Administrative processes should be implemented to ensure that radioactive materials are not handled by anyone other than certified or approved personnel trained in source reduction techniques.

Records and Audits: Accurate records provide a baseline for evaluating the effectiveness of various practices aimed at source minimization.

Charging For Waste Generation: Volume reduction incentives can be accomplished through policies that charge waste storage and disposal costs directly to the department or function which generated the waste, rather than assigning it to "overhead."

DESIGN AND ENGINEERING/EQUIPMENT

LLW production can be minimized by using sound design and engineering practices during the planning and construction of the company or institution's facility. Some of the areas where design and engineering can be effective include:

Contamination Control: Identifying sources of potential contamination during the facility design stage can enable planning of proper construction materials, monitoring equipment, isolating equipment and materials such as coatings or mats that prevent contamination.

Equipment: Pieces of machinery that will become contaminated should be isolated form those pieces that do not require direct contact with radiation sources. remote operations, or removable compartmentalized equipment, should be incorporated into plant design.

Isolating Contamination Areas: Design and layout of radiation areas should include personnel monitoring areas to reduce the spread of contamination to other parts of the facility. Proper ventilation system design and aid contamination control.

Reuse Of Equipment: Recycling protective clothing by laundering and using personal radiation detection devices to prolong the periods between washing can help reduce a large portion of dry compatible wastes. Recycling process streams (such as ion exchange materials) can reduce waste requiring disposal.

Equipment Decontamination: If possible, equipment should be designed to be decontaminated for reuse, thereby avoiding disposal.

Storage For Decay: Plant design should incorporate sufficient space to store contaminated items (waste, tools, equipment, etc.) for decay if contaminated by short-lived radionuclides.

Isolation From Sources Of Radiation: Plant design should isolate equipment form sources of radiation to reduce the number of contaminated items of equipment requiring disposal. Automated equipment can reduce radiation exposure to plant workers.

Process Planning: Designing processes that incorporate reduced usage of radionuclides or substitute non-radioactive materials for radioactive ones can aid in source minimization. "Process dynamics must be understood in order to maintain optimum process conditions. Operator efficiency and reliability affect LLW generation. Untrained person require closer supervision and instruction as well as more elaborate facilities."

Waste Treatment: Plant design should include waste treatment so that treatment methods are used not only to process waste but also to maintain efficiency of operation.

OPERATION AND MAINTENANCE

Activities during operation and maintenance can minimize the sources generating LLW and waste volumes. Some areas that can be effective include:

Contamination Control: Maintenance of systems or equipment which become contaminated can often be decontaminated, rather than disposed of, by covering surfaces with plastic, strippable paint or other materials that can reduce the quantities of contaminated material generated during maintenance. Using alternatives other than organic chemicals to clean radioactively-contaminated material generated during maintenance. Using alternatives other than organic chemicals to clean radioactively-contaminated equipment can avoid the generation of mixed waste.

Good "Housekeeping" Practices: Controlling the purchases of radioactive materials to avoid "over-purchases" and optimize inventory control can eliminate waste generation from unused source materials.

Scheduling: Maintenance activities should be planned to occur during off-shift periods or holidays.

Equipment Repair: Repairing equipment for reuse rather than replacement can reduce LLW generation. However, repair should be evaluated against such factors as (1) the production of other wastes (hazardous or solid); (2) the potential for greater radiation exposure during repair; (3) added decontamination wastes; (4) time and repair costs; and (5) replacement with superior parts or equipment.

Proper Equipment Operation: The proper functioning of equipment will reduce wastes generated form failures or upsets in process. Reducing equipment "downtimes" can lower the amount of LLW requiring disposal.

Remote Monitoring: Monitoring devices which do not require sampling by workers will reduce wastes that would come from "wipe tests" or physical sampling.

Operations Analysis: Operating conditions should be analyzed to identify and reduce radiological hazards. Non-radioactive materials or those with shorter half-lives should be substituted where possible.

Training: Operations and maintenance employees should be fully familiar with procedures that can reduce LLW generation. Repeat training programs can ensure better employee understanding and implementation.

Preventative Maintenance: Preventative maintenance can reduce the generation of LLW by avoiding serious equipment damage and reducing the frequency of unscheduled downtime.

Contractor Responsibilities: Contractors hired to work inside contamination areas should be responsible for disposing of any waste they produce. This policy will act as an incentive to keep contractor generated waste to a minimum.

Written Operation and Maintenance (O and M Procedures): Manuals and other written O and M practices, which provide clear instructions for personnel, will help ensure the continuation of procedures which facilitate reductions in LLW generation.

DECONTAMINATION AND DECOMMISSIONING

Decontamination means the removal of radioactive material from surfaces such as building walls and floors, tools and equipment, or from fluids. Decommissioning means to remove safely from service an activity involving radioactive materials or waste, so that residual radioactivity can be reduced to a level that permits release of the property for unrestricted use as well as termination of the radioactive materials user's license. Decontamination is one aspect of decommissioning.

Decontamination methods can be developed to reduce radiation exposure, lower the amount of waste requiring disposal, and extend the life of plant equipment. Some areas where decontamination can be effective include:

Evaluate Decontamination Processes: Determine what type of decontamination method result in the lowest amount of waste. Methods include:

- mechanical decontamination: vacuuming, scrubbing and then absorbing liquid (or soaking and absorbing); high-pressure stream and water cleaning; abrasive decontamination (sand blasting, planing down surfaces, etc);

- chemical decontamination: use of specific chemicals (solvents, acids, etc.), followed by rinsing; and

- special decontamination; ultrasonic cleaning , electropolishing, or freon cleaning.

Contamination Control: Methods of controlling contamination can reduce the time, labor and materials necessary for decontamination.

Equipment Reuse: Recycling materials and equipment may produce waste generated during decontamination, and should therefore be compared with the disposal volume of contaminated materials and equipment, before considering their recycling.

Decontamination of Process Streams: Reusing process streams through decontamination can prevent waste production.

Selecting Decontamination Cleaning Solutions: Cleaning agents (solvents, detergents, etc.) should not produce mixed waste.

While decommissioning will necessarily produce additional quantities of waste, the outcome of eliminating future LLW generation and enabling the property to be available for unrestricted use has a positive overall S/WVM outcome.

OTHER VOLUME REDUCTION TECHNOLOGIES

In addition to storage for decay, there are a number of other volume reduction technologies used to minimize waste generated. As has been noted in the discussion of storage for decay, volume reduction decisions are dependent upon the physical and chemical characteristics of the waste, its radionuclide content, and specific activity as will as standards affecting its packaging, transportation and disposal.

LLW is produced in four physical forms; liquids, wet solids, dry solids and gases. When treated through various reduction technologies, gaseous wastes can be transformed to one of the other three forms. Each of these forms of waste may contain chemical characteristics or constituents that could classify it as mixed waste.

Segregation. Waste segregation can achieve significant decreases in the volume ultimately requiring disposal. Workers frequently discard paper, cloths and other waste products as radioactive waste, when these materials are not contaminated with radioactive substances, because it is easier to throw all waste into one container than to segregate the waste into that which is radioactive and that which is not. This can be a major problem in research laboratories and among other categories of radioactive materials users where personnel may work with radioactive isotopes containing both short and long half-lives. By segregating short-live from longer-lived waste, significant reduction in LLW volume can be achieved.

Sorting and separation of non-radioactive materials which were combined with radioactive materials during a specific process is also a significant volume minimization practice.

Shredding. Paper, cloth, plastics and some light metals can be shredded into smaller pieces to aid in compaction and incineration. Shredders contain a series of intermeshing, counter-rotating shafts driven by a motor to slice the waste for additional volume minimization.

Incineration. Incineration can achieve waste volume minimization factors ranging from 30:1 to 100:1 before final ash immobilization and packaging. After packaging, the volume reduction continues to be up to five times greater than any other minimization technology, including supercompaction.

Incinerators have been in use since the 1950's, but today's incineration systems have no similarity to the earlier models, except that they all burn waste. The newest incineration systems are more successful in controlling emissions, including radionuclides, acid gases, heavy metal compounds and toxins, at emission levels that are much lower than those occurring at existing fossil-fueled or waste-fueled power plants.

Incineration can minimize dry solid, liquid, wet solid, and gaseous wastes. There are two resulting by-product; one is called a "bottom" ash, and the second a "fly-ash." The bottom ash is the radioactively-contaminated waste that remains after the burning process; the fly-ash is

produced and captured as part of the off-gas particulate matter (i.e., stack residues). Both ashes can be mixed with glass, cement, concrete or other materials to ensure stability. Incineration has been used extensively by hospitals and research institutes across the country, initially to dispose of infections biological wastes and then later to volume-reduce their LLW. A survey of medical users in 1979, indicated that about one-third of the medical facilities nationally were incinerating a portion of their LLW. Two radioactive materials users in Utah have small on-site incinerators which are used to burn de minimus quantities of radioactive waste under the jurisdiction of the Utah Division of Radiation Control and the Division of Air Quality. Out-of-state commercial incinerators also are utilized by many LLW generators, especially those that produce large volumes of LLW.

Incineration can destroy some organic hazardous wastes regulated under RCRA and PCB's regulated under the federal Toxic Substances Control Act (TSCA). It can therefore convert some mixed waste into LLW, leaving ash that can be further solidified for disposal in a licensed LLW disposal facility. The advantages of incineration over other waste treatment technologies include the significant volume reductions achieved, the elimination of toxic chemicals in mixed waste, and the creation of a stable waste form. The disadvantages include concerns about risk of environmental and public health damage from the release of toxic and radioactive gases to the atmosphere.

Decontamination. Decontamination techniques remove radioactive contaminants from the surface of near-surface of objects, such as building walls and floors, tools and equipment, or from fluids. The decontamination process is achieved by the transfer of contamination to any of a number of decontamination solutions. These include alkaline permanganate, detergents, mineral acids, organic acids, chelating compounds, and water of steam under high pressure. In addition, sandblasting and electropolishing have also been used with success.

Return To The Manufacturer. This volume reduction method is not a "technology," but a "practice." However, it is included in this list because many companies and institutions in the Utah use this volume minimizing procedure. Approximately 140 licensees use radioactive sealed sources in their business. When the radiation inside decays to the point that the sealed sources are no longer useful, they retain levels of radioactivity that require them to be handled as radioactive waste. Sealed sources should be returned to the manufacturer where they may be held for decay, processed for reuse, or disposed of.

Recovery Through Recycling. Some materials are available that have a high content of a marketable product such as uranium waste. This material can be reprocessed through normal operations to recover the product from the waste material.

RECOMMENDATIONS FOR A UTAH SOURCE AND WASTE VOLUME MINIMIZATION PROGRAM

A source and volume minimization program is essential for LLW generators who want to take responsibility for achieving source and volume reduction. An effective minimization program involves radioactive materials users, persons with professional training and experience in environmental protection and others qualified to provide advice on the development of the minimization program and to evaluate its implementation and effectiveness. Each LLW minimization plan should include:

- a "policy statement" presenting the licensee's goals for achieving minimization;
- a "summary report" explaining the licensee's evaluation of possible opportunities to achieve additional levels of minimization;
- a " minimization plan" describing the licensee's intended actions to achieve the minimization goals;
- a "summary of employee training" activities to ensure that all employees have basic knowledge of common waste problems, and all necessary workers have the needed technical skills perform minimization activities.
- an " evaluation" of how source minimization, volume minimization and storage for decay can be incorporated into any future business plans; and
- a descriptions of the strategies to be used to measure the success of the licensee's minimization program.

The following recommendations are elements pertaining to an effective S/WVM program:

- avoid unnecessary contamination of items during the use of radioactive materials;
- segregate radioactive waste from non-radioactive trash: and
- prepare and implement plans for the utilization of all appropriate methods for source minimization, volume minimization, and storage for decay.

Some type of minimization program by radioactive material licensees should be implemented. A regulatory program containing percent reduction goals is not suggested, but instead suggests a program which is heavily dependent upon building a cooperative relationship with licensees for the purposes of:

- promoting and coordinating exchanges of information among LLW generators on the technical aspects of minimization processes and procedures;
- providing an educational outreach program element to assist the public, media, policy-makers, and others to evaluate waste minimization and other radioactive waste issues from a position of knowledge; and
- encourage policy development, planning, and implementation of waste minimization strategies

Table 2-1
Waste Minimization Technologies

Technology	Waste Forms			
	Dry Solids	Liquids	Wet Solids	Gases
Compaction	X	–	–	–
Supercompaction	X	–	–	–
Segregation	X	X	X	–
Shredding	X	–	–	–
Incineration	X	X	X	X
Filtration	–	X	X	X
Ion Exchange	–	X	–	–
Evaporation	–	X	–	–
Crystallization	–	X	–	–
Flocculation	–	X	–	–
Precipitation	–	X	–	–
Sedimentation	–	X	X	–
Centrifugation	–	X	X	–
Drying	–	–	X	–
Dewatering	–	–	X	–

Source: U.S Department of Energy. Low-Level Radioactive Waste Treatment Technology. DOE/LLW-13Te. National Low-Level Radioactive Waste Management Program, Idaho Falls, ID, July, 1984.

SUMMARY

The economic benefits of S/WVM program can be substantial, even though they may represent a small investment. The overall benefit to the radioactive materials user and the general public can be determined by conducting a follow-up operational assessment, and comparing the results to the baseline information collected from an initial assessment, including the impact on products and services.

The ideal objective for the user of radioactive materials, in addition to the program objectives stated above, would be the reduction of both the gross volume and the radioactivity per unit volume, while net profit is maintained or increased.

ELEMENT 3 (19-3-107(2)(c)

EVALUATE RADIOACTIVE WASTE TREATMENT AND DISPOSAL OPTIONS, AS WELL AS RADIOACTIVE WASTE NEEDS AND EXISTING CAPACITY

- Discussion of the following treatment/disposal options:

  Brokers
  Decay-in-storage
  Solidification of liquid wastes
  Incineration
  Release to the sewer system
  Commercial facilities
  Land disposal above ground
  Land disposal below ground
  Super compaction
  Improvements in storage/disposal - support of research and development

- Radioactive waste needs and existing capacity are addressed by Element 1

EVALUATION OF RADIOACTIVE WASTE TREATMENT AND DISPOSAL CAPACITY

The following is an evaluation of radioactive waste treatment and disposal options.

DECAY-IN-STORAGE

Decay-in-storage is one of the most frequently used on-site treatment processes in which low-level radioactive waste with a relatively short half-life is held for natural radioactive decay. After the low-level radioactive waste has decayed to essentially background radiation levels, it can be disposed of as non-radioactive trash.

R313-32-92 of the Utah Radiation Control Rules allows a licensee to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal in ordinary trash if it meets the following conditions: it is held for decay a minimum of ten half-lives; it is monitored at the container surface before disposal to determine that its radioactivity cannot be distinguished from background; all radiation labels are obliterated or removed; and generator columns are individually monitored with all radiation shielding removed.

Conditions of radioactive material licenses may allow licensees to hold radioactive material with a physical half-life of greater than 65 days for decay-in-storage.

Low-level radioactive waste may be held for decay-in-storage at a number of locations: on-site where the low-level waste (LLW) is produced, off-site at a broker or processing plant, a storage facility, or a low-level waste disposal facility prior to disposal. The length of on-site storage is limited by each licensee's possession limits as well as space available for decay-in-storage.

The advantage of this treatment process is that wastes are minimized through decay-in-storage and eventually eliminated as non-radioactive waste.

The disadvantages of this process, as well as other types of waste storage, might include:

- potential for operating problems resulting in release of radioactive material due to the lack of experience in managing large quantities of waste for extended periods of time;
- potential for greater exposure of workers to radiation due to the increased quantity of curies in storage;
- potential lack of shielding to reduce exposure to workers;

- lack of periodic inspections to ensure package integrity;
- potential for fires, explosions, or other incidents due to chemical reactions as a result of inexperience in handling LLW which has been shipped to treatment and disposal sites;
- potential for spills if liquid is held in storage which requires handling prior to disposal;
- potential for corrosion or loss of package integrity of storage containers if LLW is not properly treated and package for extended storage; and
- potential for unstable storage locations or unsafe design to be used at sites of some LLW generators, which could allow radioactive wastes to enter the environment during extended storage periods.

The Nuclear Regulatory Commission issued an Information Notice to low-level waste generators in February of 1992, which was to assist LLW generators in preventing the potential problems discussed above. The Information Notice recommends the following (which is also applicable for decay-in-storage):

- Stored waste should be shielded from the elements, temperature extremes and humidity to ensure package integrity and the maintenance of waste form (solid, liquid or gaseous waste).
- Waste should be stored in an area that allows for routine visual inspection and radiation monitoring.
- Licensees should evaluate what wastes they plan to store, and take measures to prevent decomposition or chemical reaction from "incompatible" waste material over time.
- Licensees should store waste in a manner that ensures no potential increase in direct radiation exposure to workers above the limits established in 10 CFR (Code of Federal Regulations) Part 20 (Utah Radiation Control Rules, R313-15).
- Stored wastes should be placed in a "restricted" area and locked to prevent unauthorized access.
- Inventory records of wastes types, contents, and dates of storage should be maintained.

SOLIDIFICATION OF LIQUID WASTES

The following is a discussion of treatment processes for liquids which result in solidification or preliminary treatment prior to the solidification process:

Filtration is a process in which solid particles are removed from LLW liquids by forcing liquids through a permeable material using gravity, pressure or vacuum. Fluids containing suspended solids may collect within the filter pores or on the surface as a filter "cake".

Approximately 90% of the suspended solid weight is removed. Filtration is used to remove solids from process water and radioactive materials from gaseous emissions.

Ion Exchange is a technology which uses chemical resins to transfer or exchange atoms in radioactive material with resin material atoms resulting in the removal of radionuclides from LLW liquids. This technology can reduce the liquid radionuclide waste by factors of 10 to 100. (See Figure 3-A)

Evaporation is a process which utilizes heat to evaporate water out of radioactive material resulting in volume reduction of the waste. The waste constituents become more concentrated, reduced in volume, and the vaporized water can be condensed and reused or discharged. (See Figure 3-B)

Flocculation is a technique which utilizes chemicals to gather small suspended particles of liquid waste into larger particles or clusters.

Precipitation is a treatment method by which dissolved particles of solids are removed from liquid LLW by changing them into solid waste.

Sedimentation is a process by which particles are removed or settled out of liquids by the force of gravity. This process is often used together with precipitation and flocculation to reduce the volume of wet solids and separate them from bulk liquid LLW.

Centrifugation is a technology that uses centrifugal force to separate solids from liquids. This technology is used to dewater resins and filter sludges. The sludges containing 5% solids can be centrifuged into sludges containing up to 50% solids.

Crystallization is a treatment process in which solids are precipitated out of liquid LLW through an evaporation-related, volume reduction method that produces a concentrated radioactive slurry and evaporated water. The water can then be condensed and reused or discharged.

Drying is a process by which dryers use heat to remove liquid producing a dry solid form of LLW.

Dewatering is a process which uses pumps or gravity to draw water from wet solids through filter devices.

Solidification is a treatment technique in which various materials are mixed with LLW as they are placed into disposal containers. The LLW becomes a stable, solid block. Solidifiers may consist of cement, asphalt, plastics and polyethylene.

The chemical process of polymerization solidifies liquid and solid waste through the use of chemical polymers which encapsulate small particles or droplets into a hardened polymer matrix. Since polymer systems do not require water, they result in volume reduction. The positive impact of polymer-solidified wastes are as follows: when properly produced and controlled, they can meet NRC requirements for a structurally stable waste form; they have good leaching resistant properties; and they possess compressive strengths of 1,500 to 9,000 pounds per square inch.

The negative impact of polymerization include: higher costs; more precise measurement requirements; handling and mixing of chemical constituent requirements; and the potential for some wastes to chemically interact with wastes resulting in the prevention of polymerization.

Cement reacts chemically with liquid radioactive waste, solidifying and physically encapsulating it. It is advantageous as a solidification agent because it is easy to mix, compatible with most types of wastes, provides shielding and strength, has low leachability for most radionuclides, is low-cost, is readily available, and has a history of performance. The disadvantages of cement are related to an increase in waste volume, an increase in weight, maintenance problems related to cement dust, an increased sensitivity to acidity of the LLW mixture due to cement alkalinity properties, and an increase in the generation of heat, the potential for cracking and the chemical interaction with certain ingredients in the waste that sometimes will prevent the successful stabilization of the waste form.

Asphalt is also used for LLW solidification. The use of asphalt does not involve a chemical reaction. It surrounds the waste, isolating it from water. The positive impact of asphalt includes: its capability of solidifying most waste streams; its possession of leach resistant properties for certain wastes; its use produces no free standing water; and its low cost. The negative impacts include: the need for heat in the mixing process which may cause vaporization of waste material potentially igniting and causing fires; the potential for flammability at low temperatures; potential for swelling and cracking; potential for decomposition into gaseous products; the potential for heat exposure of the asphalt-LLW mixture to cause separation and liquefaction; the potential of solidification process to produces gases; the possession of low structural strength; and the lack of solidifying capabilities for certain organic materials.

The advantage of solidifying wastes is that LLW are made more manageable, thereby reducing the potential for detrimental effects to the health, safety and environment. The treatment of wastes can have a number of positive impacts by reducing the potential for radionuclides to be released during storage, transportation or disposal; eliminating the radioactive and/or hazardous

chemical contaminants of LLW; reducing waste volumes; changing liquids into solids or semi-solids; and reducing the potential for waste to react adversely with its container.

Some of the negative effects of on-site treatment may be as follows: increased radiation exposure to workers; increased potential for spills or releases; increased activity levels resulting from volume reduction requiring package and transport changes; and an increased potential for toxic chemical or heavy equipment accidents leading to fires, explosions, worker exposure and environmental releases.

Off-site treatment impacts could include the above as well as the increased potential for transportation accidents; increased potential for a greater number of workers receiving exposure; and increased potential for more serious off-site incidents resulting from larger quantities of LLW treated from many generators.

INCINERATION

Incineration is a volume reduction treatment technology that produces LLW reductions ranging from 30:1 to 100:1 before ash removal and packaging. It can minimize solid, liquid, wet solid and gaseous wastes. The products which are produced are "bottom ash" and "fly ash". The radioactive waste that remains after incineration is the bottom ash; the off-gas particulate matter that is produced and captured is the fly-ash. Stability can be ensured by mixing both of these ashes with glass, cement, concrete or other material. Incineration of LLW can give off gaseous effluents which require trapping to remove radioactive materials as well as hazardous chemicals produced during combustion. Carbon-14 and hydrogen-3 are more difficult to trap in the gaseous effluents because radioactive carbon dioxide and radioactive water are produced in the burning process, thereby increasing the potential for atmospheric release.

The Utah Radiation Control Rules set limits on concentrations of radionuclides which can be released to the atmosphere in R313-15. Proper monitoring can ensure better operation.

The positive impact of incineration is the significant volume reduction, elimination of toxic wastes in mixed wastes, and production of a stable waste form. The negative impacts would be the concentration of radioactivity with higher levels of exposure and greater potential for worker exposure, and the potential risk of environmental and public health damage from the release of toxic and radioactive gases to the atmosphere.

R313-15-1004 of the Utah Radiation Control Rules states that a licensee may treat or dispose of licensed material by incineration only in amounts and forms specified in R313-13-1005 or as specifically approved by the Executive Secretary pursuant to R313-15-1002.

RELEASE TO THE SANITARY SEWER SYSTEM

The Utah Radiation Control Rule, R313-15-1003, states that a licensee may discharge licensed material into the sanitary sewerage if each of the following conditions is satisfied: it is readily soluble, or dispersable biological material in water; the quantity of any radioactive material released into the sewer system in any month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration of material listed in Table III of Appendix B of 10 CFR 20.1001 to 20.2402, 1993 ed., which is incorporated by reference; if more than one radionuclide is released, than the licensee shall determine the fraction of the limit as stated in R313-15-1003(c)(i) and the sum shall not exceed unity; and the total quantity of licensed radioactive material released into the sewerage system in a year does not exceed 185 GBq (five Ci) of hydrogen-3, 37 GBq (one Ci) of carbon-14, and 37 GBq (one Ci) of all other radioactive materials combined. Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subjected to the limitations contained in R313-15-1003(1).

The quantities of radioactive material allowed to be discharged into the sewer are very small quantities which are assumed to be diluted by the volume of sewage flowing through the system.

EXEMPT QUANTITIES

Minute quantities of radioactive material may be disposed of without regard to its radioactivity.

R313-15-306 of the Utah Radiation Control Rules allows: 0.05 microcurie or less of carbon-14 per gram or hydrogen-3 of medium used for liquid scintillation counting; and 0.05 microcurie or less of hydrogen-3 or carbon-14 per gram of animal tissue averaged over the weight of the entire animal to be disposed of as non-radioactive trash.

SUPERCOMPACTION

Compaction is one of the most effective volume-reduction technologies utilized to reduce dry solid LLW. A machine is used to exert a force ranging from 10 tons (conventional compactors) to 5000 tons (supercompaction). (See Figures 3-C and 3-D)

Supercompactors are high pressured compactors which can compress metal LLW into the final disposal container. Box compactors can compress larger objects into rectangular shaped containers using forces up to 250 tons.

Compactor efficiency in reducing volume is based upon the force applied, density of the waste and the "spring back" characteristic of the waste after the compaction pressure is released. Compactability can be is improved if the waste material is shredded.

LAND DISPOSAL ABOVE-GROUND

Above-ground land disposal refers to an engineered structure located on the surface at the natural grade of the land. The above ground facilities that will be discussed are above-ground vaults, above-ground vaults with earthen cover, and above-ground vaults with modular canisters or overpacks.

An above-ground vault is an engineered structure located above ground into which radioactive waste is placed. The reinforced-steel and concrete structure has floors, walls and ceilings built around individual cells. The cells are used for the disposal and isolation of waste. The roof may be part of the original cell or it may be placed over the cell after it has been filled. Waste may be placed in the cell by an overhead crane or remote controlled hoisting device.

The floor is constructed with a slight slope to drain water into a collecting system. The drainage of each vault is continuously collected and monitored through a drainage system, sumps and standpipes.

Wastes are separated according to Class A, B or C and placed into the cell. The cell is filled with sand or other material between the spaces of the waste packages and the cell is then closed. (See Figures 3-E and 3-H)

Above-ground vaults with earthen covers are similar in structure to the technology of the above ground vault with the addition of a layered earthen cover which is placed over and around the structure to protect the vault from environmental conditions that may affect above-ground facilities.

The cover consists of layers of sand or gravel, clay, stone, and soil which act as barriers that prevent the infiltration of water and serve as drainage for rainwater. It decreases the time in which water could come into contact with the waste if the cement vault were damaged. The cover also acts as a barrier for radiation protection for workers, the public and any intruders.

Above-ground vaults with modular canisters or overpacks incorporate two above-ground technologies consisting of concrete overpacks or modular canisters which are placed into above-ground vaults providing a facility design with two engineered barriers. (See Figure 3-F)

This type of facility could also include an earthen-mounded above-ground vault with canisters or overpacks. Other variations would involve the use of LLW disposal methods which incorporate above-ground and below-ground technologies.

BELOW-GROUND DISPOSAL

Below-ground land disposal may include shallow land burial, below-ground modular concrete canister disposal, below-ground vaults, mined cavity disposal and borehole or augered hole disposal.

Shallow land burial consists of excavated trenches lined with gravel in which waste containers are stacked. The void spaces between the containers and the trench covers are made of soil, sand, gravel or other earthen material. Potential radionuclide migration is monitored by collecting water from narrow drainage ditches that run parallel to the trenches. (See Figure 3-J) (Envirocare of Utah, Inc., is a Commercial LLW facility that utilizes shallow land burial; however, the design is different from this. See Element 1, Utah Commercial LLW Facility for a description.)

To meet long term structural stability requirements, the stability is provided by the form in which the waste is disposed of or by the design of waste packages. If Class C wastes are placed in shallow land burial sites, they must be covered by 16.4 feet of earth or placed in high integrity containers which are designed to be stable (maintain gross physical properties and identity) over 300 years.

Below-ground modular concrete canister disposal utilizes concrete canisters which are placed in shallow trenches. The canisters are overpacks consisting of six and 12-foot tall steel-reinforced concrete cylinder-shaped containers with ten centimeter or thicker walls that hold several waste packages.

Upon arrival, packages containing LLW waste are placed in a building and then are put in concrete canisters. The canisters are then sealed and disposed of in trenches. Class A canisters are stacked in three tiers and spaces between them are filled with sand. Class C and B waste canisters are placed into trenches in two layers instead of three layers so a thicker cover can be placed over them.

The trenches are excavated with a slope so that water will drain to one end. Thin graveled filled drainage ditches are built parallel to the trenches so that water can be pumped or sampled from sandpipes located within the drains. The concrete canisters provide structural stability as well as act as barriers which restrict water, animals or people from accessing the waste. A soil cover placed over the site serves as protection from radiation exposure. (See Figure 3-K)

A below-ground vault consists of an enclosed, engineered structure built below the earths surface. The vaults may be constructed of reinforced concrete, masonry blocks, fabricated metal, plastic or a combination of these materials. The type of materials used in construction determines the shape of the vault. (See Figure 3-L)

An earthen cover is placed upon the top of the vault and serves as a barrier from water seepage. The concrete vault sides, top and the earth cover act as barriers which reduce waste/water contact, prevent animal and human intrusion, and reduce radiation exposure at the ground level. Soil and plastics covers reduce damage to the concrete from weather conditions.

LLW packages are lowered into the ground by a crane, and sand or other materials are used to fill void spaces. A roof is constructed over the Class A vaults after they are filled to the top. Class B and C vaults are filled to within 6.5 feet of the top of the vault. This space is filled with sand, gravel or other materials to provide radiation shielding for workers (that install the concrete roof over the vault). After the roof of the vault has been installed, sandy gravel is placed in the spaces between the vault and earthen trench walls.

Temporary covers can be used during the time when waste is being lowered into the vault to keep the waste packages from being affected by environmental conditions.

A drainage system beneath the vaults collects water entering below, and a secondary drainage system is located outside of the vault. Sumps capture all surface and ground water which are monitored during the operation, closure and institutional control periods. (See Figure 3-I)

MINE CAVITY DISPOSAL

An alternate technology is the use of old underground mines for the LLW disposal. These mines can be bored through rock with tunnel-boring equipment and rooms can be divided to accommodate the disposal of different classes of LLW. There are three different types of mine cavities that could be considered for disposal. A slope mine uses an inclined tunnel of a shaft for access into a mine cavity. A drift mine is accessed through a near-horizontal shaft or tunnel. The shaft mine has a steep, generally vertical shaft dug form the surface to the mine cavity. The location of the mine may be below-ground, above sea level, bored into a side of a mountain or hill.

There is a concern that the groundwater infiltration into the mine cavity could be a problem. This could be prevented by constructing the disposal facility at a slight down-hill grade so that water which may enter the waste storage areas or tunnels could be collected and drained through the use of a gravity system.

Concrete or synthetic materials may be used to line the mine cavity. For added stability and isolation, concrete canisters, vaults or other structures may be used for waste in the cavity.

BOREHOLE OR AUGERED HOLE DISPOSAL

This technology uses an auger or other device to bore a hole of a desired width and length into the ground for the disposal of LLW. "Shaft disposal" is another term used to describe this technology. (See Figure 3-N)

The width and depth of the holes are dependent upon the drilling rig size; the larger the size of the rig, the greater the diameter of the hole.

The use of this technology is limited to research laboratory sites under the Department of Energy in the United States. The DOE experiments that use boreholes for waste disposal are located at the Nevada Test Site, Nevada; Savannah River Plant, South Carolina; Oak Ridge National Laboratory, Tennessee; and Los Alamos National Laboratory, New Mexico. (See Figure 3-M)

At the Nevada Test Site, LLW containing high specific activity has been placed in a central waste shaft surrounded by nine smaller holes containing monitoring and testing equipment. The shaft is 10 feet in diameter and 120 feet deep. Thirty feet of the shaft is used for disposal. The top 20 feet and bottom 70 feet are backfilled.

The Savannah River Plant test consisted of boreholes nine feet in diameter and 32 feet in depth Class B LLW is placed into the boreholes. The bottom two feet of the hole is filled with gravel and a grout pad; a fiberglass liner seals the bottom and serves as a barrier between the soil and the waste package.

A second liner, 10-foot long steel collar is lowered into the hole inside the fiberglass. The waste is placed into 55 gallon drums and then lowered into the holes.

The holes at the Oak Ridge National Laboratory are approximately three feet in diameter and an average of 20 feet deep. These holes are located upon shale which separates them from the water table. The holes are surrounded by water sampling and other equipment. Radionuclide migration has never been detected.

The boreholes at the Los Alamos National Laboratory are approximately 2.5 feet in diameter and 65 feet in depth. Concrete is used to line some of these boreholes.

Canada stores ion exchange resins from nuclear power plants in a variation of the borehole concept. These holes are vertically set concrete pipes that are placed on concrete foundations. A drainage system under the pipes monitors and controls water drainage. (See Figure 3-O)

BROKERS

Brokers are licensed in the State of Utah and other states and may act as an intermediary between a licensee and an authorized recipient for the packaging, storage, transportation, treatment or disposal of radioactive material. The broker may dispose of wastes of licensees through other brokers or directly to a waste disposal site. In the State of Utah there is one broker who is authorized to receive, process, store packaged and prepackaged waste and transfer to authorized recipients. This licensee is authorized to hold radioactive material with a physical half-life of less than 90 days for decay-in-storage before disposal in ordinary trash. Repackaging of waste is also authorized under this broker's license. The licensee is authorized to transport licensed material or deliver licensed material to carriers for transport in accordance with the provisions of R313-19-100, "Transportation", of the Utah Radiation Control Rules.

COMMERCIAL FACILITIES

Commercial facilities are made up of individuals or companies who are licensed to treat, store, bury, transfer or transport radioactive wastes.

The State of Utah has one disposal facility which is a private commercial facility that disposes of certain Low-Level and Mixed Radioactive Waste. The facility, Envirocare of Utah, Inc., is expected to receive authorization from the Nuclear Regulatory Commission to store and dispose of uranium mill tailings [11(e)2, of the Atomic Energy Act] wastes. (See Element 1, Utah Commercial LLW Facility for a further description of Envirocare of Utah, Inc.)

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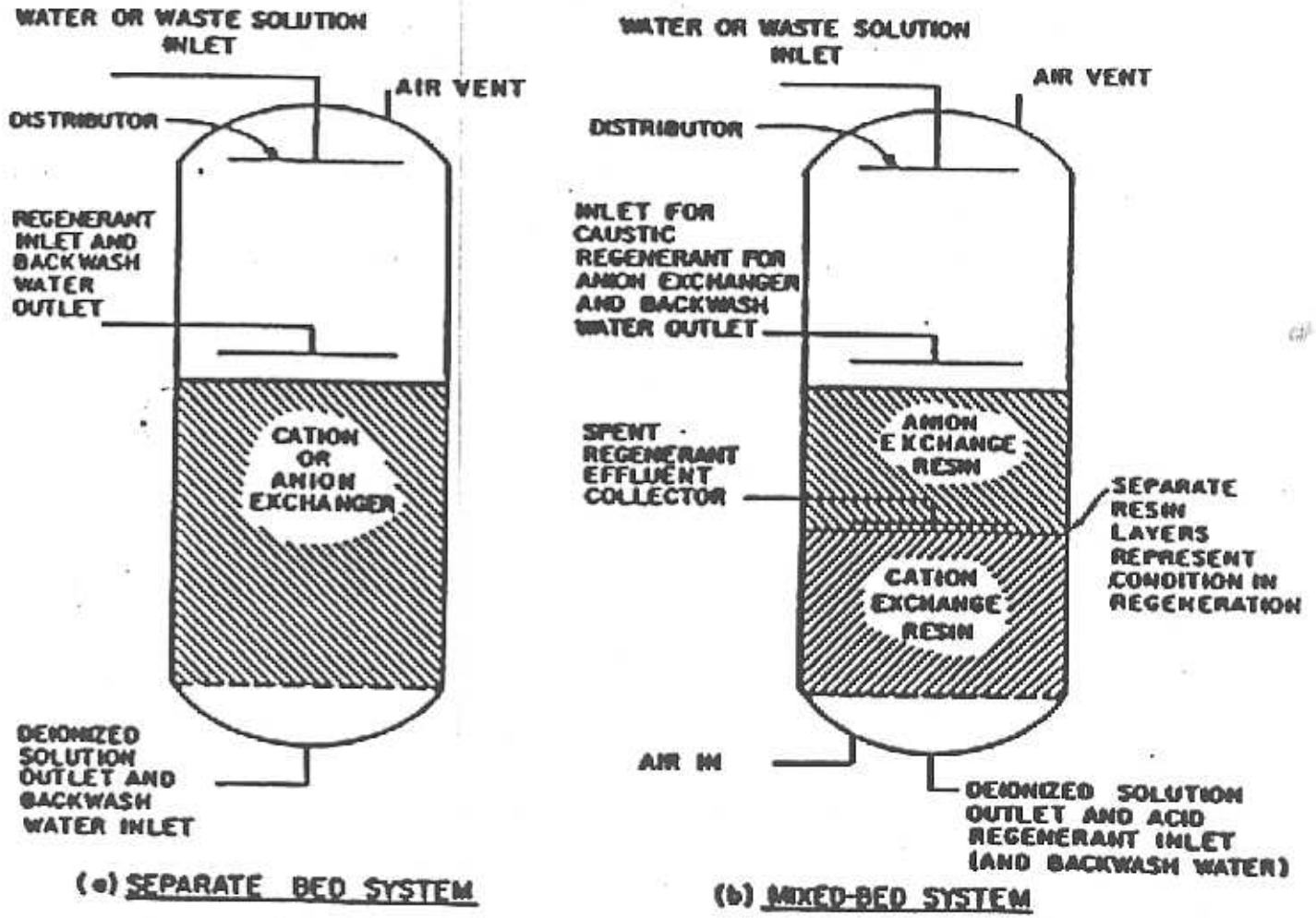
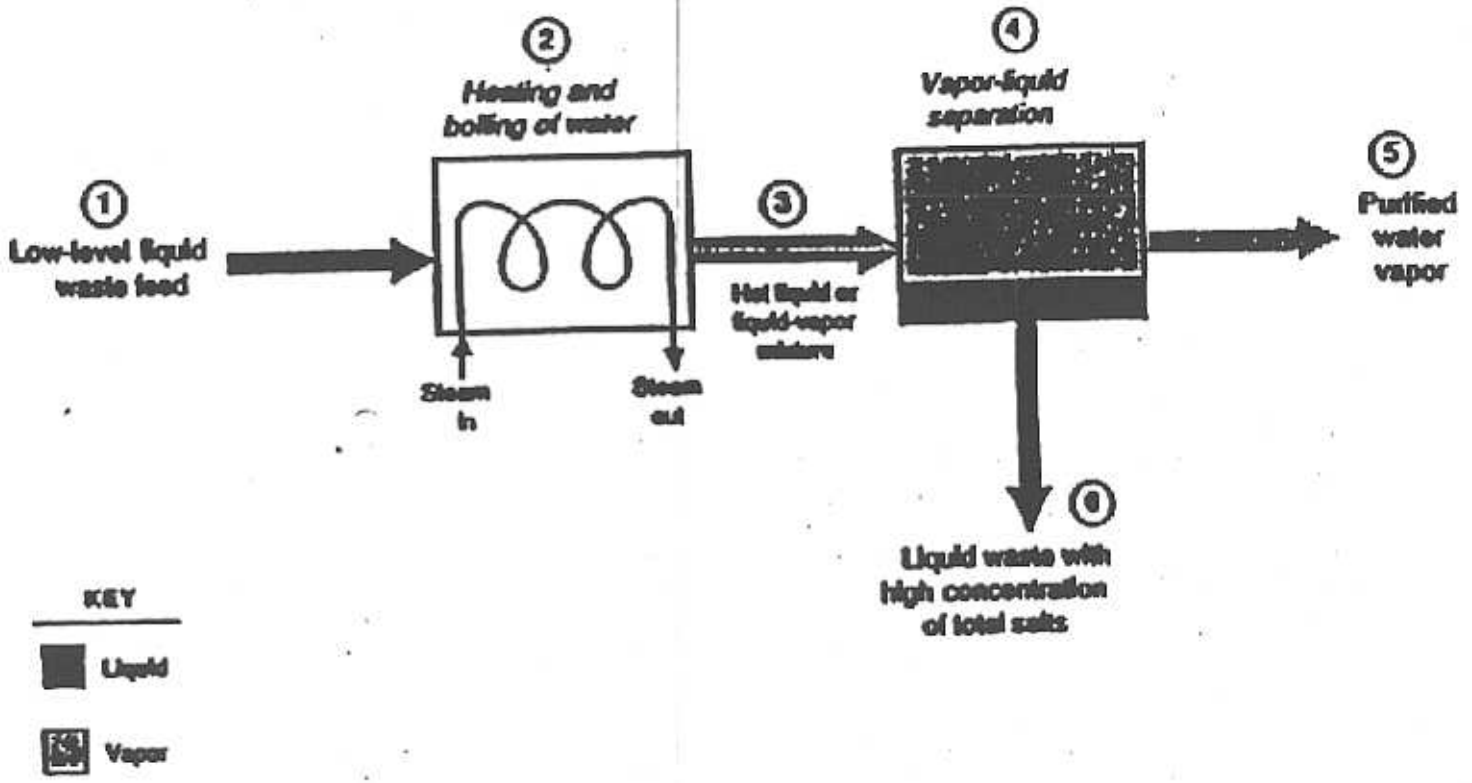
Figure 3-A

Diagram of Mixed Bed and Separate-bed Ion Exchange Systems



Source: National Low-Level Radioactive Waste Management Program. Low-Level Radioactive Waste Treatment Technolo DOE/LLW-13Tc, Idaho Falls, ID, July, 1984.

Figure 3-B
Simplified Evaporation/Crystallization Process



(1) The low-level waste "feed" consists of water contaminated with low concentrations of dissolved radioactive material.
(2) The feed is heated with steam in a heat exchanger, boiling off some water.
(3) A mixture of hot liquid and evaporated water vapor is produced.
(4) The water vapor and liquid are separated into two streams:
(5) One is relatively pure water vapor.
(6) The second is a liquid solution highly concentrated with nonvolatile radioactive material.

Figure 3-C
Conventional Compactor

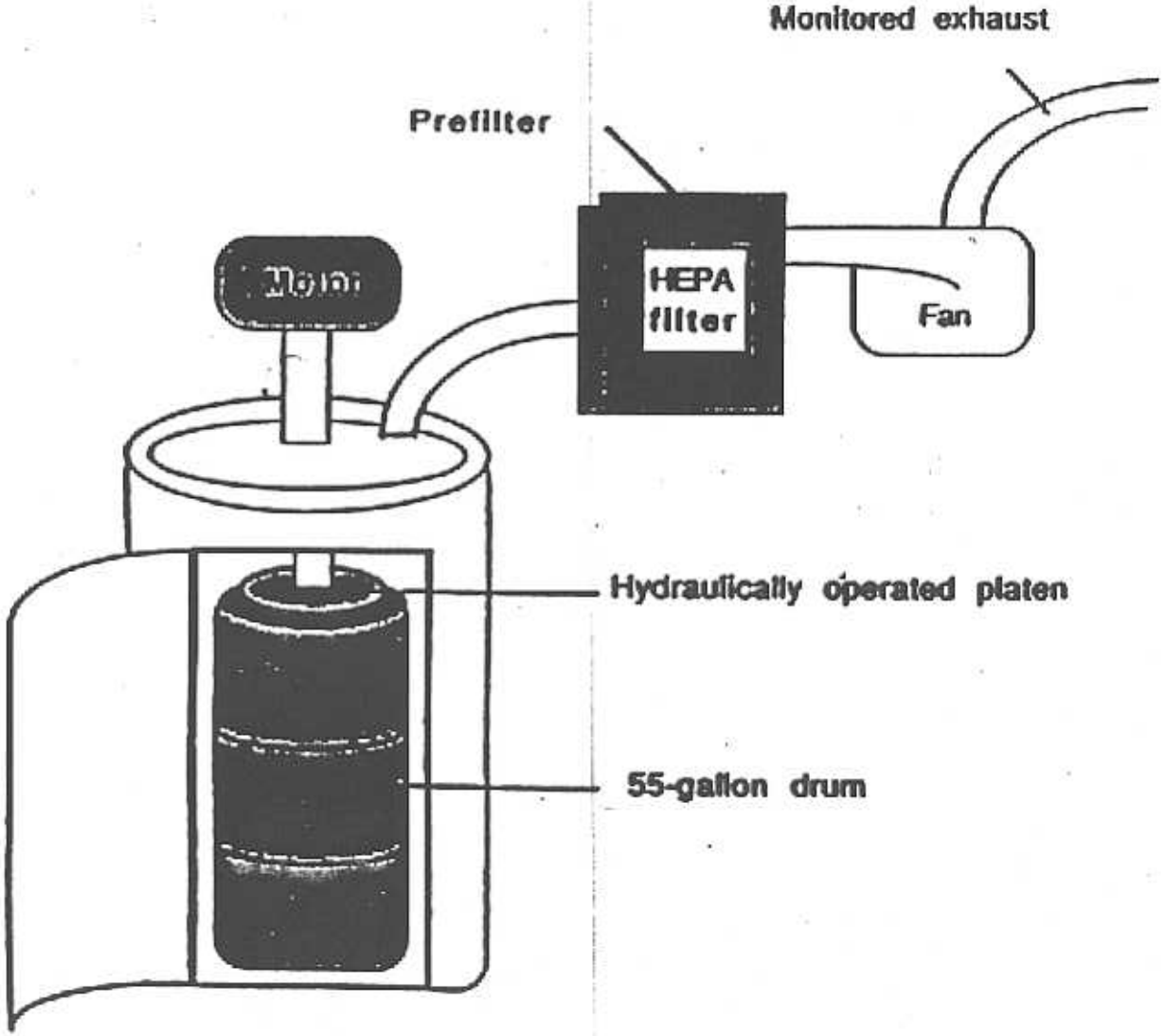
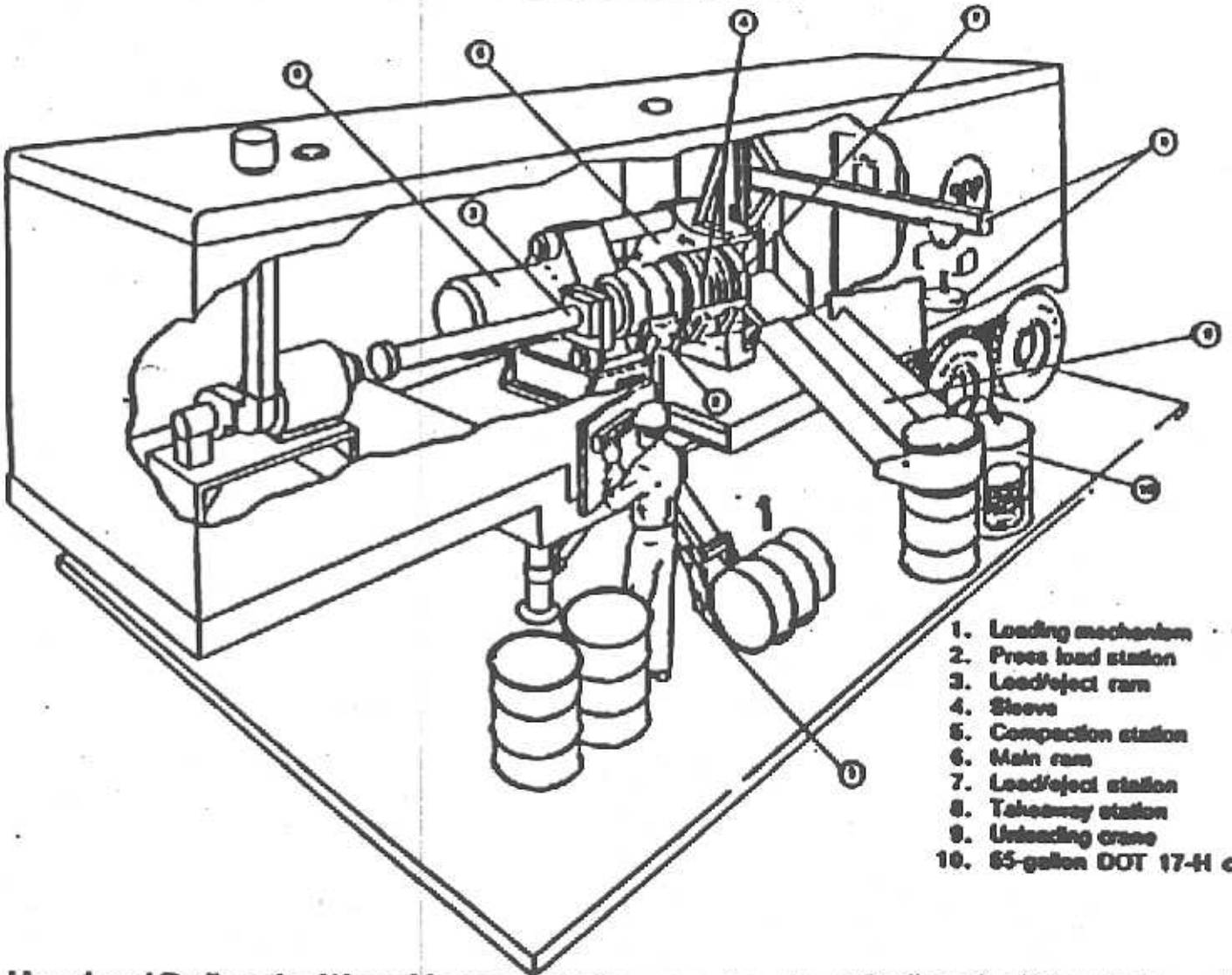
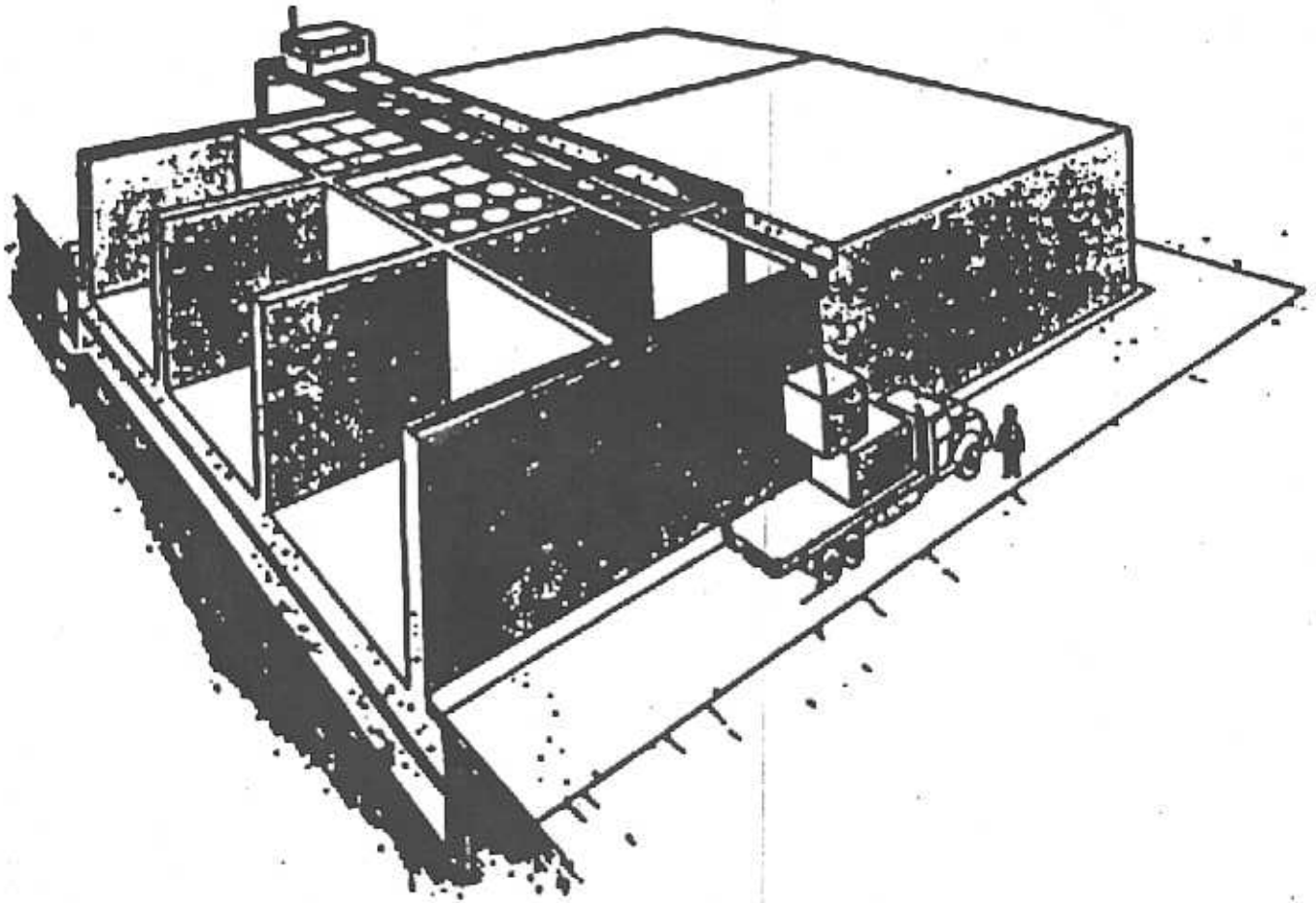


Figure 3-D
Mobile Supercompactor



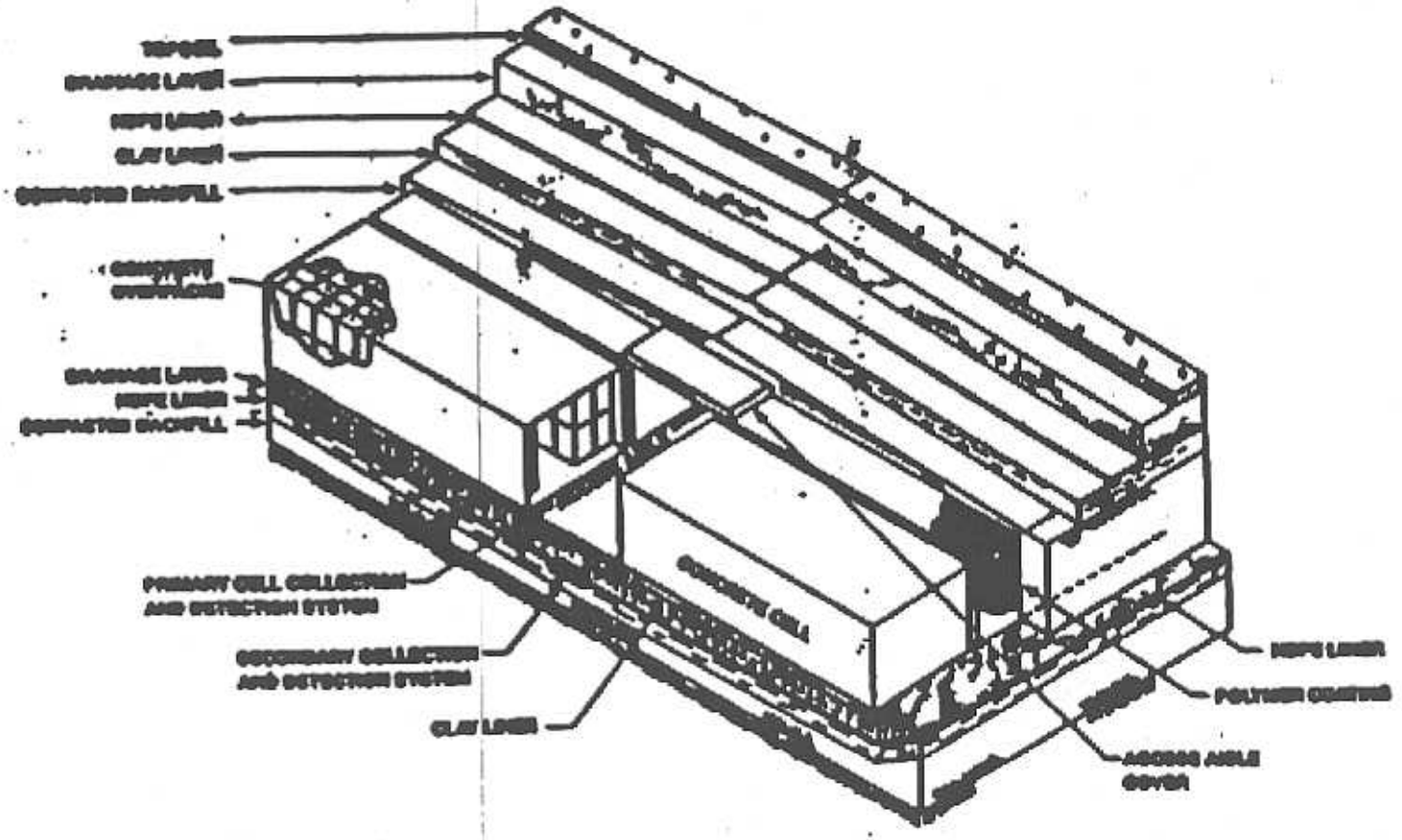
Source: National Low-Level Radioactive Waste Management Program. Low-Level Radioactive Waste Volume Reduction Stabilization Technologies Resource Manual. DOE/LW-76T. Idaho Falls, ID. December, 1988.

Figure 3-E
Above-Ground Vault



Source: Rogers and Associates Engineering Corporation. Conceptual Design Report: Alternative Concepts for Low-Level Radioactive Waste Disposal. DOE/LLW-60T, EG&G Idaho, Inc., Idaho Falls, ID, June, 1987.

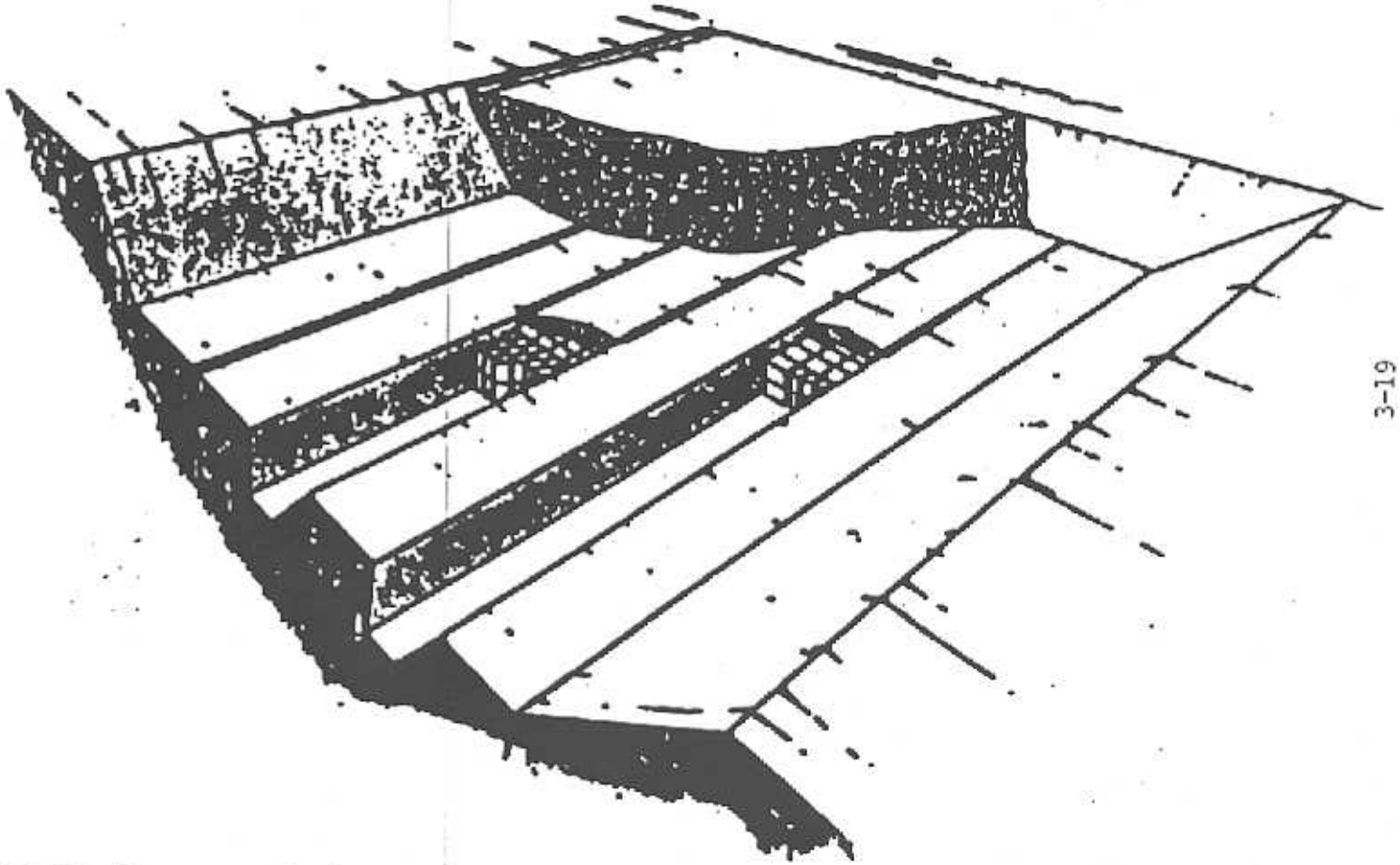
Figure 3-F
Above-Ground Vault with Concrete Overpacks



Source: Anderson, R.T., Chem-Nuclear Systems, Inc. "Concrete Overpack: Utilization as an Engineered Barrier for Low-Level Radioactive Waste Disposal." Paper presented to the Host State Technical Coordinating Committee, St. Louis, MO, Jan. 8, 1991.

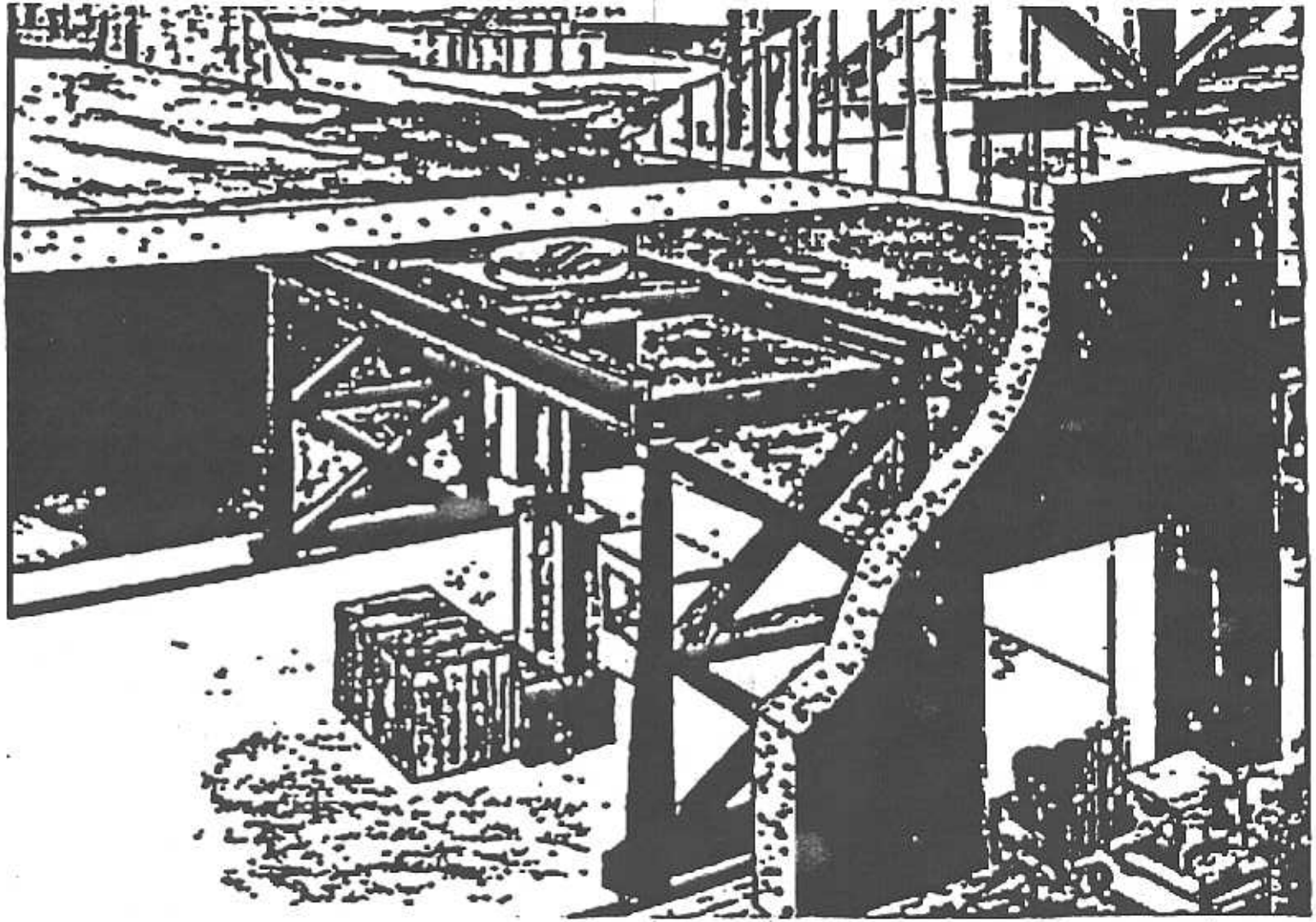
Figure 3-G

Trenches for Class B and C waste, Intermediate Depth Disposal



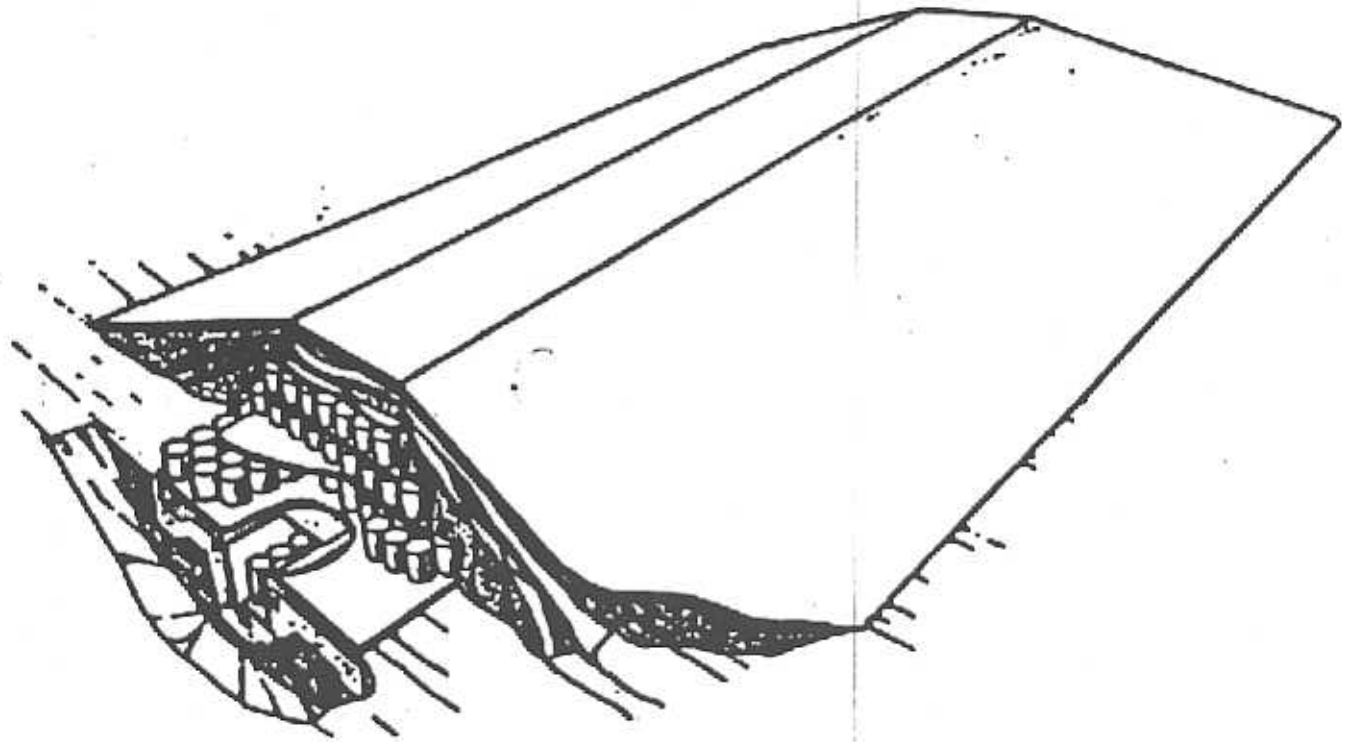
Source: Rogers and Associates Engineering Corporation. Conceptual Design Report: Alternative Concepts for Low-Level Radioactive Waste Disposal. DOE/LLW-60T, EG&G Idaho, Inc., Idaho Falls, ID, June, 1987.

Figure 3-H
US Ecology Design of Above-Ground Vaults Inside Vaults for Central Interstate Compact Facility



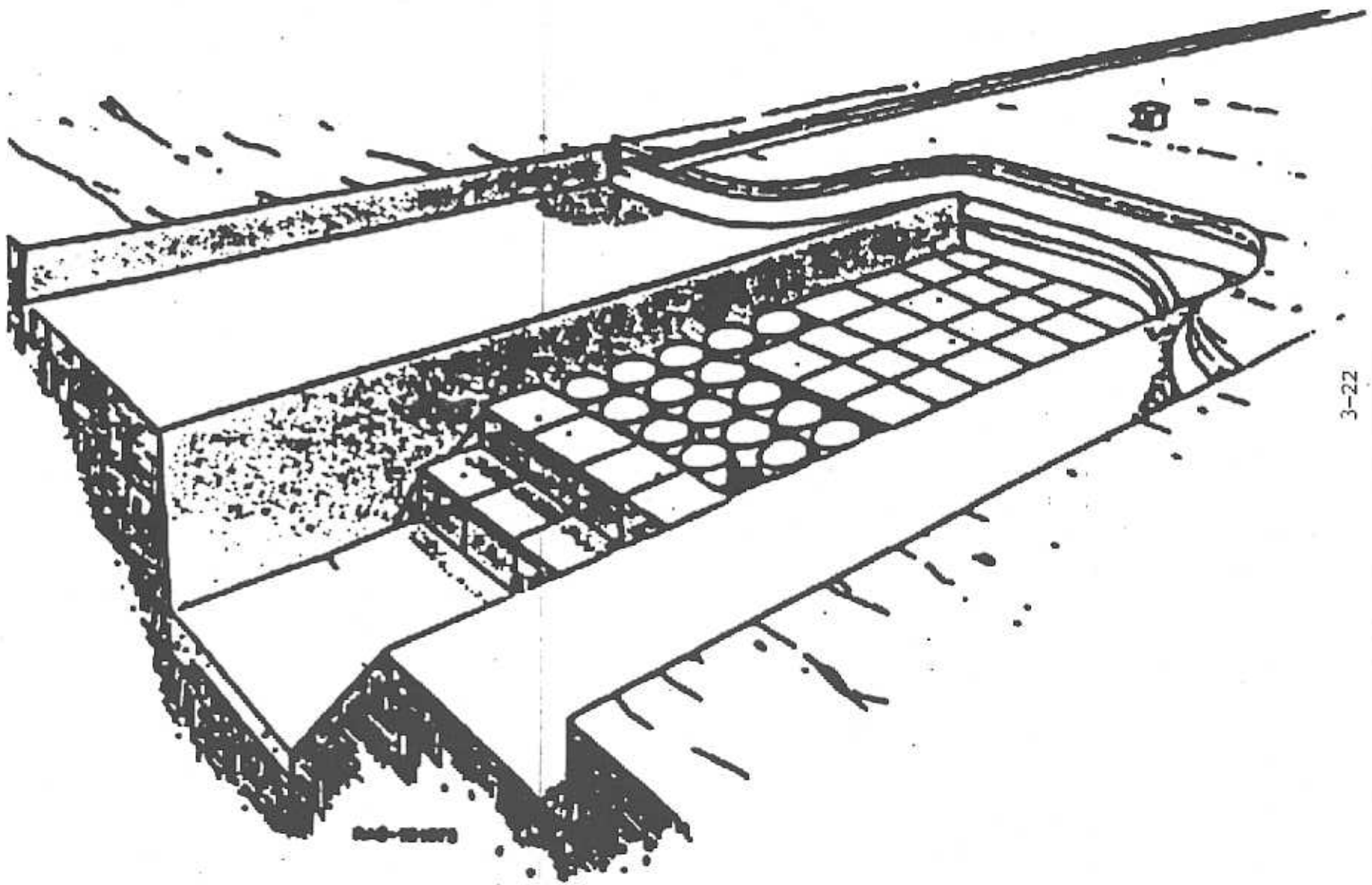
Source: US Ecology

Figure 3-1
Earth-Mounded Concrete Bunker



Source: Rogers and Associates Engineering Corporation. Conceptual Design Report: Alternative Concepts for Low-Level Radioactive Waste Disposal. DOE/LLW-60T, EG&G Idaho, Inc., Idaho Falls, ID, June, 1987.

Figure 3-1
Shallow Land Burial Site



3-22

Rogers and Associates Engineering Corporation, Conceptual Desig

Figure 3-K
Below-Ground Modular Concrete Canister Disposal

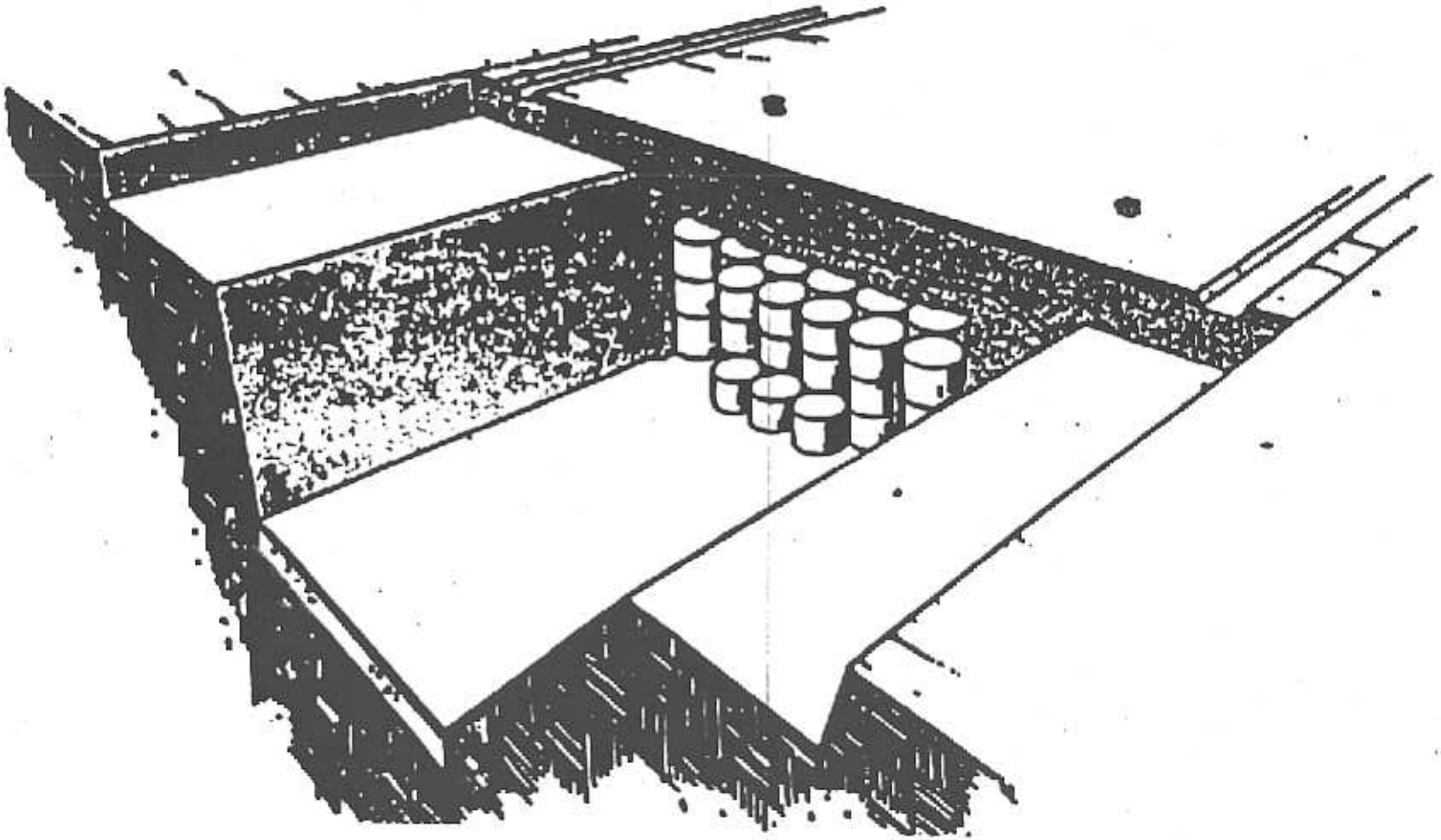
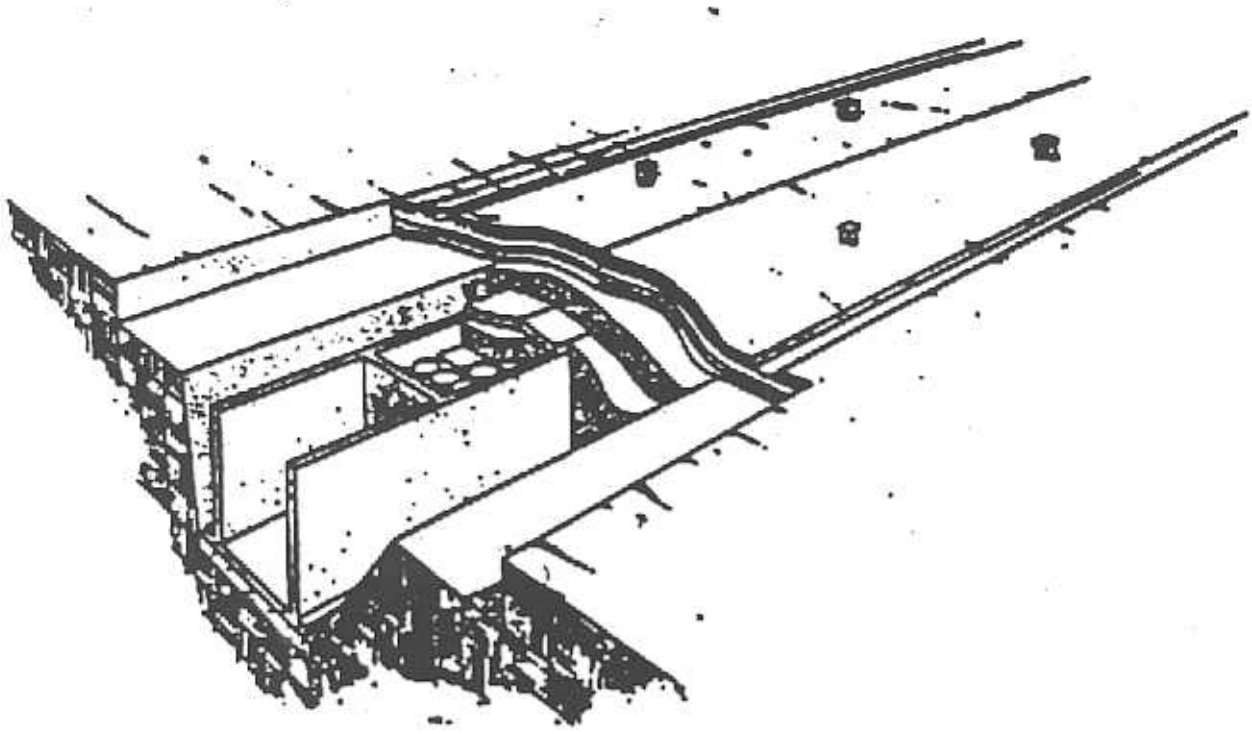
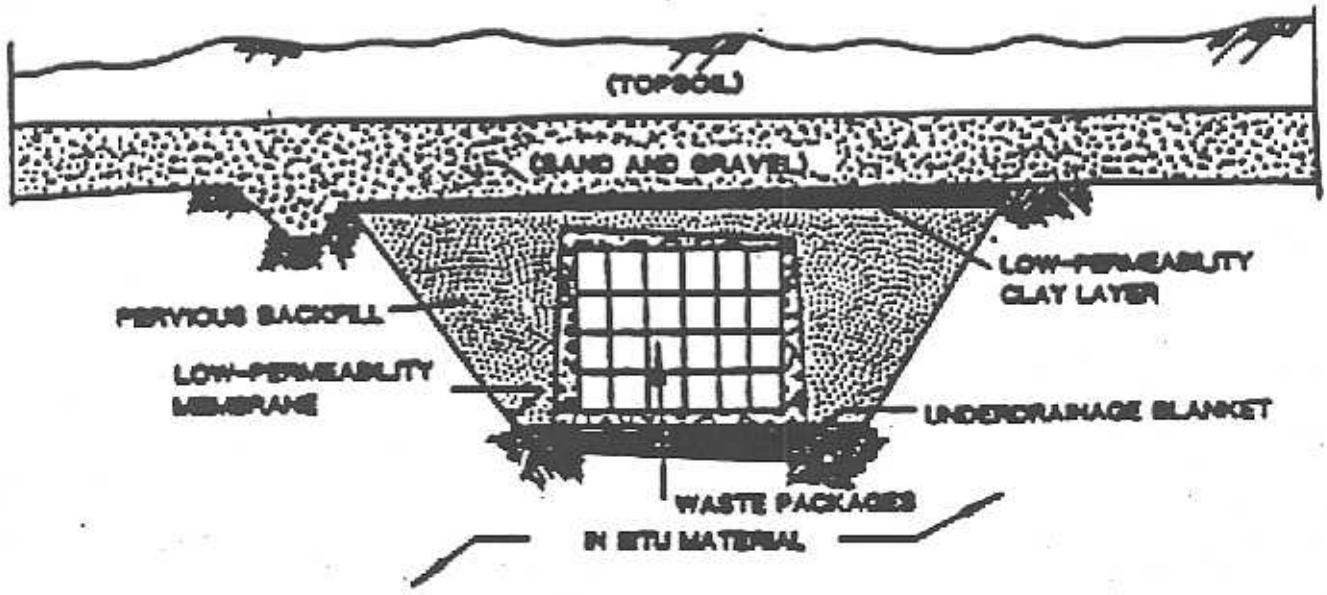


Figure 3-L

Below Ground Vault

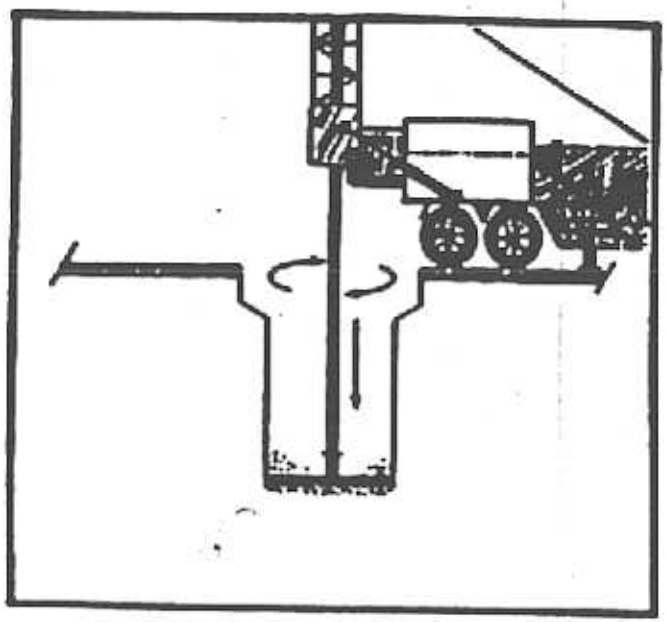


Source: Rogers and Associates Engineering Corporation. Conceptual Design Report: Alternative Concepts for Low-Level Radioactive Waste Disposal. DOE/LLW-60T, EG&G Idaho, Inc., Idaho Falls, ID, June, 1987.

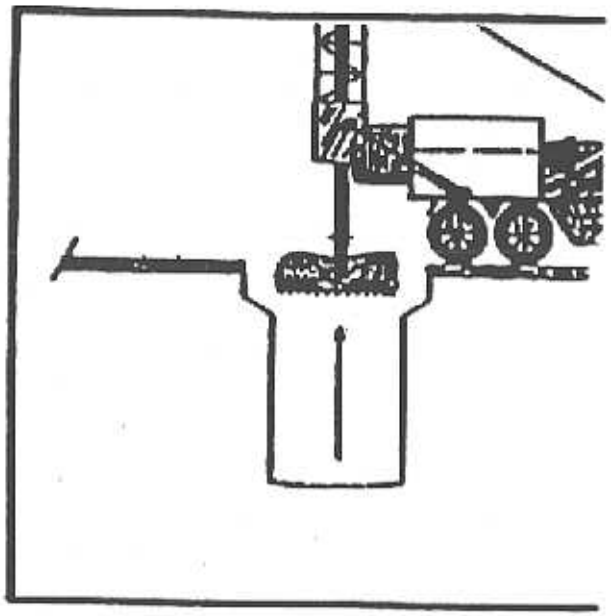


Warriner, J.B and Bennett, R.D. Alternative Methods for Disposal of Low-Level Radioactive Wastes,Task 2a: Technical Requirements for Belowground Vault Disposal, NUREG/CR-3774, Vol.2, US NRC, Washington, DC, October, 1986.

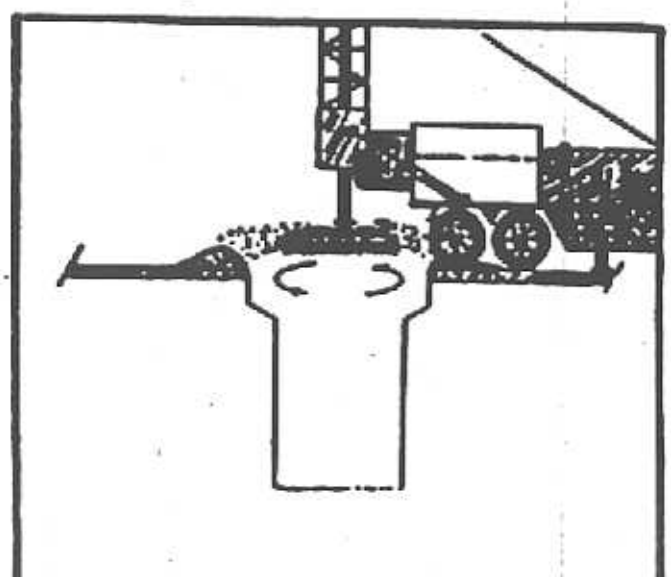
Figure 3-M
Borehole or Augered Hole



Auger drills into soil



Bit carries soil to surface



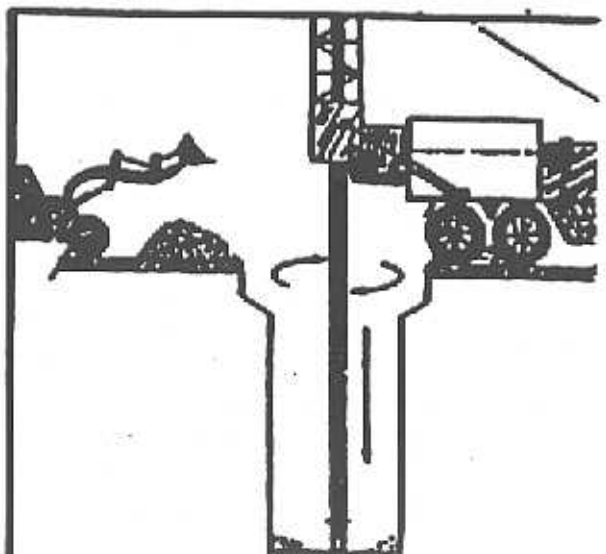
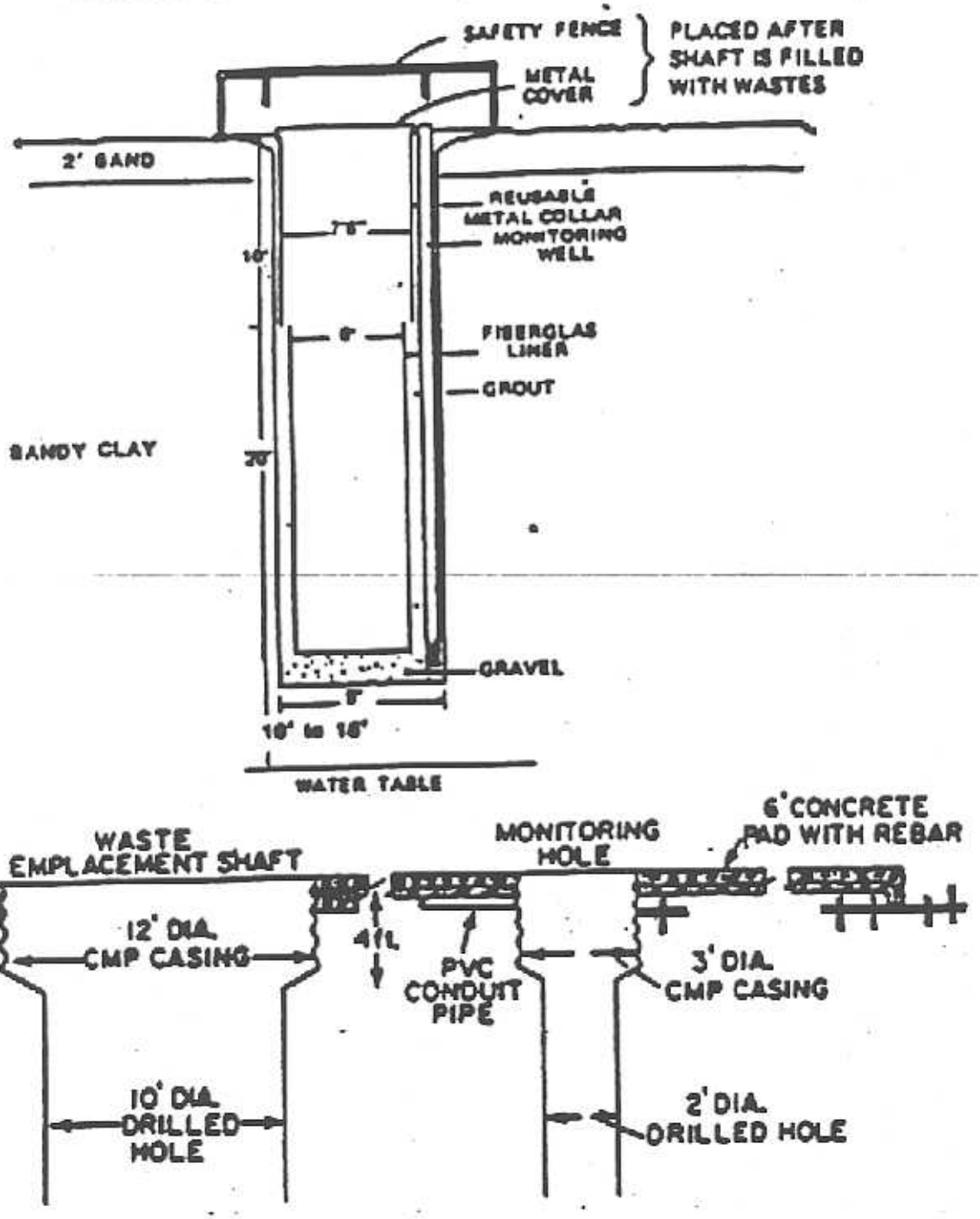
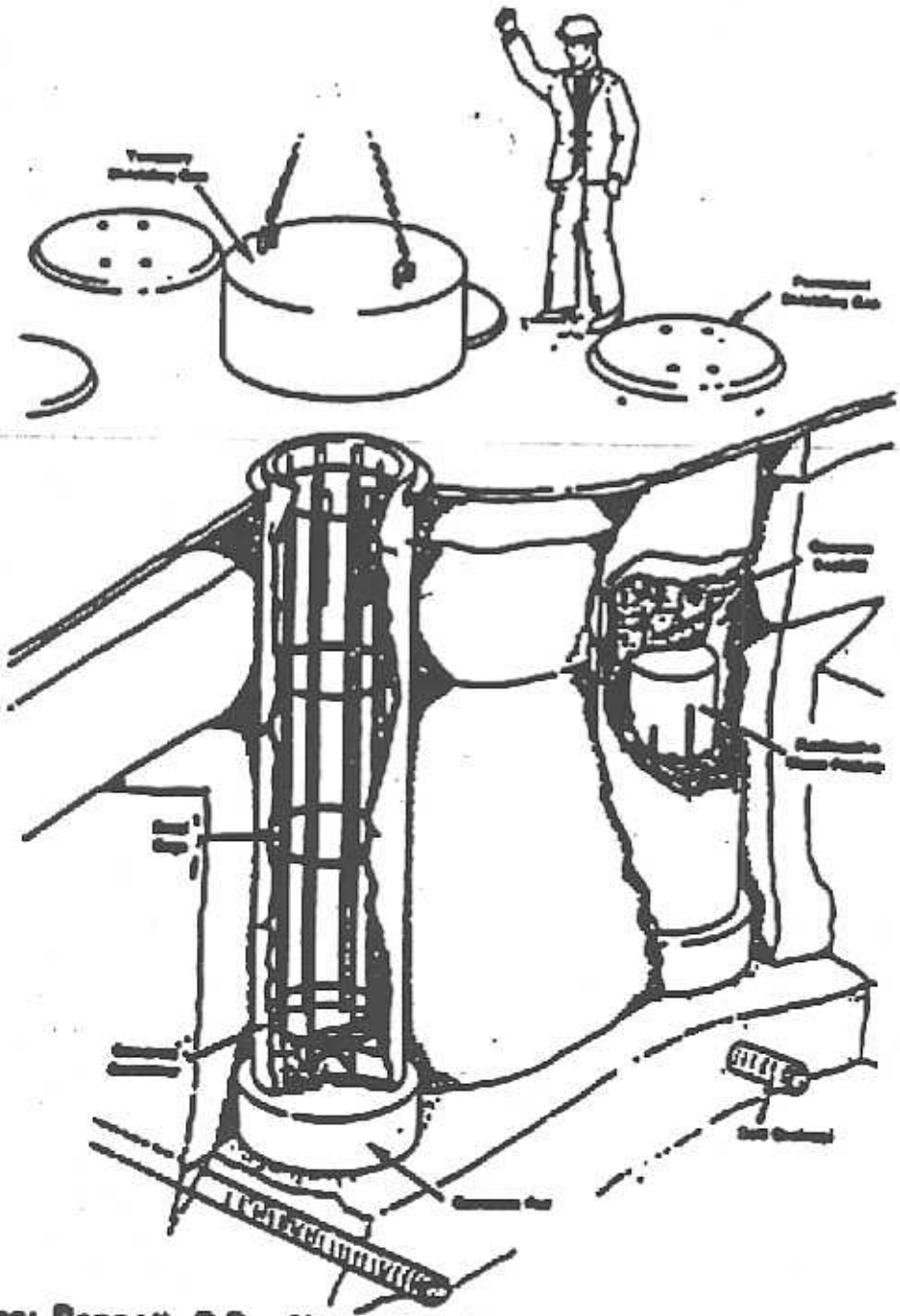


Figure 3-N
Greater Confinement Disposal Tests



...mett, R.D. Alternative Methods for Disposal of Low-Level Radioactive Wastes: Task 2e: Technical for Shaft Disposal." NUREG/CR-3774, Vol. 8, US Nuclear Regulatory Commission, Washington, DC, October,

Figure 3-0
Canadian "Tiehole" Disposal



Source: Bennett, R.D. Alternative Methods for Disposal of Low-Level Radioactive Wastes: Task 2a: Technical Requirements for Shaft Disposal." NUREG/CR-3774, Vol. 5, US Nuclear Regulatory Commission, Washington, DC. October, 1985.

ELEMENT 4 (19-3-107(2)(d)
EVALUATE FACILITY SITING, DESIGN, AND OPERATION

- Discussion of commercial versus non-commercial storage, treatment, and disposal facilities
- Description of existing statutory requirements relating to siting
- Discussion of siting criteria currently in effect for radioactive waste facilities
- Description of facility types and applicable requirements:

  Storage:

  - On-site (most licensees)
  - Off-site (brokers, decay-in-storage)

  Treatment:

  - On-site
  - Off-site

  Land Disposal:

  - Off-site

- Description of Utah rules that are equivalent to 10 CFR 61 (Land disposal of radioactive waste)

STATUTORY REQUIREMENTS RELATING TO SITING OF COMMERCIAL LLRW DISPOSAL FACILITIES

Utah Code Annotated (UCA) 19-3-103 provides for the establishing of a Radiation Control Board whose responsibilities include the "licensing of radiation sources that constitute a significant health hazard" and the Board may make rules for "controlling exposures to sources of radiation...". UCA 19-3-103(8) states that the Board may: (a) establish criteria for siting commercial low-level radioactive treatment or disposal facilities, (b) any facility for which a radioactive materials license is required by the rules "shall comply" with section UCA 19-3-103 and (c) a facility may not receive a radioactive materials license until siting criteria have been established by the Board.

In accordance with UCA 19-3-103 the Radiation Control Board adopted siting criteria by rule. R313-25-3(1) through (8) set forth the siting criteria for a commercial low-level radioactive disposal facility. Prior to submission and review of a license application, a potential licensee "shall" demonstrate that the proposed location(s) for the facility meet the siting criteria. The siting criteria relate to the following parameters:

Water Resource Protection
Geology
Demographics
Meteorology and Climatology
Transportation
Land Use and Resource
Air Quality
Socioeconomic Impacts
Potential Adverse Impacts from Release of Radionuclides

Within each category, different evaluation methods are used to measure the suitability of the site. These methods include minimum distances between the site and sensitive human or environmental receptors, distances from factors which could interfere with the ability of the site to isolate the waste, geological and hydrogeological characteristics that are known to affect migration of contaminants, and the potential of the site to release radiation at levels which present a threat to any member of the public.

Not every characteristic of a site is critical to its ability to meet the criteria. As a result, site characteristics can be evaluated under three categories: exclusion, conditional consideration and preference. The presence of an exclusion characteristic bars a location from being selected. A conditional consideration may be present if it is likely to be resolved at a later period in the facility development process or if it can be demonstrated to be insignificant in light of factors particular to that location. The extent of a site's preferential characteristics may be weighed by the Board in making its final selection.

As previously mentioned, R313-25-3 delineates siting criteria, and "prelicensing plan approval" requirements. The specific siting criteria are as follows:

R313-25-3 Siting Criteria and Pre-licensing Plan Approval for Commercial Radioactive Waste Disposal Facilities.

(1) Persons proposing to construct or operate commercial radioactive waste disposal facilities, including waste incinerators, shall obtain a plan approval from the Executive Secretary before applying for a license. Plans shall meet the siting criteria and plan approval requirements of R313-25-3 and UCA 19-3-105.

(2) The siting criteria and plan approval requirements in R313-25-3 apply to prelicensing plan approval applications.

(3) Treatment and disposal facilities, including commercial radioactive waste incinerators, shall not be located:

(a) within or underlain by:

(i) national, state, and county parks, monuments, and recreation areas; designated wilderness and wilderness study areas; wild and scenic river areas;

(ii) ecologically and scientifically significant natural areas, including wildlife management areas and habitats for listed or proposed endangered species as designated by federal law;

(iii) 100 year floodplains;

(iv) areas 200 feet from Holocene faults;

(v) underground mines, salt domes and salt beds;

(vi) dam failure flood areas;

(vii) areas subject to landslide, mud flow, or other earth movement, unless adverse impacts can be mitigated;

(viii) farmlands classified or evaluated as "prime", "unique", or of "statewide importance" by the U.S. Department of Agricultural Soil Conservation Service under the Prime Farmland Protection Act;

(ix) *areas five miles of existing permanent dwellings, residential areas, and other habitable structures, including schools, churches, and historic structures;*

(x) *areas five miles of surface waters including intermittent streams, perennial streams, rivers, lakes, reservoirs, and wetlands.*

(xi) *areas 100 feet of uranium mill tailings;*

(xii) *areas 1000 feet of archeological sites to which adverse impacts cannot reasonably be mitigated;*

(xiii) *recharge zones of aquifers containing ground water which has a total dissolved solids content of less than 10,000 mg/l; or*

(xiv) *drinking water source protection areas designated by the State Drinking Water Committee;*

(b) *in areas:*

(i) *above or underlain by aquifers containing ground water which has a total dissolved solids content of less than 500 mg/l and which aquifers do not exceed state ground water standards for pollutants;*

(ii) *above or underlain by aquifers containing ground water which has a total dissolved solids content between 3000 and 10,000 mg/l when the distance from the surface to the ground water is less than 100 ft.;*

(iii) *areas, such as areas of extensive withdrawal of water, gas, or oil;*

(iv) *above or underlain by weak and unstable soils, including soils that lose their ability to support foundations as a result of hydrocompaction, expansion, or shrinkage;*

(v) *above or underlain by karst terrains.*

(4) *Incinerators associated with land disposal facilities may not be located above aquifers containing ground water which has a total dissolved solids content below 3000 mg/l. Incinerators not associated with ground disposal (land) facilities shall not be located above aquifers containing ground water which has a total dissolved solids content below 500 mg/l.*

(5) *Facilities may not be located within a distance to existing drinking water wells and watersheds for public water supplies of one year ground water travel time plus 1000 feet for incinerators and of five years ground water travel time plus 1000 feet for land disposal facilities.*

(6) *The plan approval application shall include hydraulic conductivity and other information necessary to estimate adequately the ground water travel distance.*

(7) *The plan approval application shall include the results of studies adequate to identify the presence of ground water aquifers in the area of the proposed site and to assess the quality of the ground water of all aquifers identified in the area of the proposed site.*

(8) *The Executive Secretary may require the applicant to conduct vadose zone or other near surface monitoring.*

Of equal importance as the siting criteria is the "prelicensing approval" process required by UCA 19-3-105 "Legislative and Gubernatorial Approval Required". This section establishes a process that includes "up front" approval of the proposed waste disposal facility by the Executive and Legislative branches before construction of the facility begins. This portion of the act also defines which changes (amendments) to an existing license which may constitute a "new" license.

Section 19-3-105:

(1) (a) *A person may not own, construct, modify, or operate any facility for the purpose of treatment or disposing of radioactive waste without first submitting and receiving the approval of the board for a radioactive material license for the facility.*

(b) *A person may not construct a new commercial radioactive waste treatment or disposal facility until:*

(i) *the requirements of Section 19-3-104 have been met;*

(ii) *in addition and subsequent to the approval required in Subsection (a), the governor and the Legislature have approved the facility; and*

(iii) *local planning and zoning has authorized the facility.*

(c) *For purposes of this section, the following items shall be treated as submission of a new license application:*

(i) the submission of a revised application specifying a different geographic site than a previously submitted application; or

(ii) an application for amendment of a commercial radioactive waste license for treatment or disposal facilities, including incinerators, if the construction would cost 50% or more of the cost of construction of the original treatment or disposal facility or the modification would result in an increase in capacity or throughput of a cumulative total of 50% of the total capacity or throughput which was approved in the facility license as of January 1, 1990, or the initial approval facility license if the initial license approval is subsequent to January 1, 1990.

(2) A person need not obtain gubernatorial or legislative approval for the construction of a radioactive waste facility for which a license application has been approved by the Department of Health or submitted to the federal Nuclear Regulatory Commission and to the Department of Health for approval before January 1, 1990, and which has been determined, on or before October 31, 1990, by the Department of Health to be complete in accordance with state and federal requirements.

(3) The board shall suspend acceptance of further applications for commercial radioactive waste facilities upon a finding that they cannot adequately oversee existing and additional radioactive waste facilities for license compliance, monitoring, and enforcement. The board shall report the suspension to the Legislative Management Committee.

(4) The board shall review each proposed radioactive waste license application to determine whether the application complies with the provisions of this chapter and the rules of the board.

(5) (a) If the radioactive license application is determined to be complete, the board shall issue a notice of completeness.

(b) If the plan is determined by the board to be incomplete, the board shall issue a notice of deficiency, listing the additional information to be provided by the applicant to complete the application.

UTAH RULES FOR THE LAND DISPOSAL OF RADIOACTIVE WASTE

In March 1984, the Governor and the Chairman of the U.S. Nuclear Regulatory Commission (NRC) entered into an agreement for discontinuance of NRC authority over certain regulated activities in Utah, the licensing and enforcement programs for the use of radioactive materials. In essence, the Governor agreed that the Utah Radiation Control Rules (and program) would be similar to and compatible with like regulations from the Federal Code, Title 10. In May 1990,

through an amended agreement with the NRC, the State received primacy for regulating the land disposal of radioactive wastes. In doing so, those portions of the existing radiation control rules relating to land disposal of radioactive wastes were a necessary part of the State's program. Specifically, R313-25 is equivalent to the NRC rule 10 CFR Part 61, "Licensing Requirements for Land Disposal Of Radioactive Waste".

The stated purpose of R313-25 is "to establish procedures, criteria, and terms and conditions upon which the Department issues licenses for the land disposal of wastes received from other persons". Rule R313-25-11 states that a license for the receipt, possession and disposal of waste containing radioactive material will be issued upon a finding that:

1. the issuance of the license will not constitute an unreasonable risk to the health and safety of the public;

2. the applicant is qualified by reason of training and experience to carry out the described disposal operations in a manner that protects health and minimizes danger to life or property;

3. the applicants proposed site, disposal design, land disposal facility operations, equipment, facilities, procedures, and disposal site closure and post closure institutional control, are adequate to protect public health and safety in accordance with all applicable sections of the rule; and

4. the financial or surety arrangements meet the requirements of the applicable sections of the rule.

Specifically, the applicant is required to provide technical analysis for the following parameters.

R313-25-7 Specific Technical Information.

The application shall include certain technical information. The following information is needed to determine whether or not the applicant can meet the performance objectives and the applicable technical requirements of R313-25:

(1) A description of the natural and demographic disposal site characteristics shall be based on and determined by disposal site selection and characterization activities. The description shall include geologic, geochemical, geotechnical, hydrologic, ecologic, archaeologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.

(2) Descriptions of the design features of the land disposal facility and of the disposal units for near-surface disposal shall include those design features related to infiltration of water; integrity of covers for disposal units; structural stability of backfill, wastes, and covers; contact of wastes with standing water; disposal site

drainage; disposal site closure and stabilization; elimination to the extent practicable of long-term disposal site maintenance; inadvertent intrusion; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.

(3) Descriptions of the principal design criteria and their relationship to the performance objectives.

(4) Descriptions of the natural events or phenomena on which the design is based and their relationship to the principal design criteria.

(5) Descriptions of codes and standards which the applicant has applied to the design, and will apply to construction of the land disposal facilities.

(6) Descriptions of the construction and operation of the land disposal facility. The description shall include as a minimum the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; types of intruder barriers; onsite traffic and drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and ground water access to the wastes. The description shall also include a description of the methods to be employed in the handling and disposal of wastes containing chelating agents or other non-radiological substances which might affect meeting the performance objectives of R313-25.

(7) A description of the disposal site closure plan, including those design features which are intended to facilitate disposal site closures and to eliminate the need for active maintenance after closure.

(8) Identification of the known natural resources at the disposal site whose exploitation could result in inadvertent intrusion into the wastes after removal of active institutional control.

(9) Descriptions of the kind, amount, classification and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.

(10) Descriptions of quality control programs, including audit and managerial controls, for the determination of natural disposal site characteristics and for quality control during the design, construction, operation, and closure of the land disposal facility and the receipt, handling, and emplacement of waste.

(11) A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in R313-25-19 and monitoring of occupational radiation exposure to ensure

compliance with the requirements of R313-15 and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site. The applicant shall describe procedures, instrumentation, facilities, and equipment appropriate to both routine and emergency operations.

(12) A description of the environmental monitoring program to provide data and to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration is indicated.

(13) Descriptions of the administrative procedures that the applicant will apply to control activities at the land disposal facility.

ELEMENT 5 (19-3-107(2)(e)

REVIEW FUNDING ALTERNATIVES FOR RADIOACTIVE WASTE MANAGEMENT

- Description of current funding of the Division of Radiation Control:

  Disposal fees
  General fund monies
  Licensing fees
  X-ray registration
  Federal grants
  State/Federal contracts

- Listing of other alternatives for funding

  Broker fees
  Generator fees
  Commercial Site access fees
  Transportation fees
  Increase in current fees
  Increase in current disposal fee

- Discussion of long term care issue (dedicating portion of disposal fees to a "rainy day or perpetual care fund" for commercial facilities

CURRENT FUNDING (FY94) OF THE DIVISION OF RADIATION CONTROL

For FY94, funding for the Division of Radiation Control consists of the following sources:

(1) ***General State*** - Funds appropriated by the Utah Legislature.

(2) ***Disposal fees***- Funds received through collections, currently of $2.25 per ton, from the Envirocare radioactive waste disposal facility.

(3) ***EPA Radon Grant*** - Funds received from the U.S. Environmental Protection Agency to administer the radon program. A 50% match is required by the State.

(4) ***X-Ray Registration*** - Funds received from X-ray registrants stipulated in the annual Department of Environmental Quality fee schedule that are deposited back into the General State funds.

(5) ***Radioactive Material License*** - Funds received from licensees of radioactive materials stipulated in the annual Department of Environmental Quality fee schedule that are deposited back into the General State funds.

(6) ***Diagnostic X-Ray Inspection*** - Funds received as a result of a contract with the Food and Drug administration to survey certain X-ray machines.

(7) ***Medicare X-Ray Inspection*** - Funds received as a result of a contract with the Utah Department of Health to survey X-ray machines at hospitals and clinics that received federal Medicare funds.

(8) ***Waste Isolation Pilot Project (WIPP)*** - Funds received from the Western Governor's Association through the Governor's Office of Planning and Budget as a result of potential shipments to the WIPP traveling by truck through parts of Northern Utah. Used for training and education of responders in the event of an incident.

(9) ***NESHAPS*** - Funds as a result of a grant from the U.S. Environmental Protection Agency for the NESHAPS program that administers toxic air pollutant release. DRC shares money with Division of Air Quality to look at the potential for radon emissions from radiologic sources. This funding for DRC will cease in FY94.

The annual development of the DRC budget is a joint effort involving the Division, Department, the Governor's Office of Planning and Budget, and the Legislative Fiscal Analyst. The Division of Radiation Control's Support Services Coordinator is responsible for developing the Division budget request and work program. Among the tasks that must be completed for this process are:

(1) Identification of revenue sources utilizing existing information and projections.

(2) Determination of Division staffing needs within the funding capabilities. Promotions and staff salary increases must be considered as part of the budget requirements update.

(3) Schedules are prepared for personnel, contracts and professional services, in and out of state travel requirements, non DP current expenses, and DP current expenses, and capital equipment needs.

(4) The DRC portion of the Department fees schedule will be updated.

(5) Building blocks and supplemental requests for DRC will be prepared if necessary.

(6) The proposed Division budget will be submitted for action by DEQ and the Governor.

The Division budget is submitted to the Department of Environmental Quality and incorporated within the Department budget. The Department budget is then submitted to the Governor's Office of Planning and Budget at the end of September. The Governor holds budget hearings around the first of November to have a final budget to present to the legislature when the session begins the third week in January of each year.

Once the budget is approved by the Legislature, it takes effect at the start of the next fiscal year (in July). During the fiscal year, DRC monitors the budget very closely to ensure adequate funds are available to complete the year's strategic goals. Monthly expenditure updates are prepared by the Support Services Coordinator and supplied to the Director which indicate expenditures to date in comparison to projected expenditures. Disposal fees received from Envirocare are monitored and tracked separately so trends in disposal fees can be addressed at an early stage from either a deficient or surplus standpoint.

Disposal fees present a challenging budget dilemma. DRC must rely on Envirocare projections of waste receipts during a particular fiscal year to fund a majority of the program. The Envirocare fees are "to cover the cost of radioactive waste disposal supervision." However, in the event that disposal fee collections do not result in enough revenue to cover the year's budget, DRC is forced into the position of applying for a supplemental appropriation to its budget from the legislature. If the supplemental request does not occur, DRC must make budget adjustments as necessary to cover the shortfall. This is similar to funding for the Division of Solid and Hazardous Waste which also relies heavily upon disposal fees to fund DSHW programs of oversight of commercial facilities.

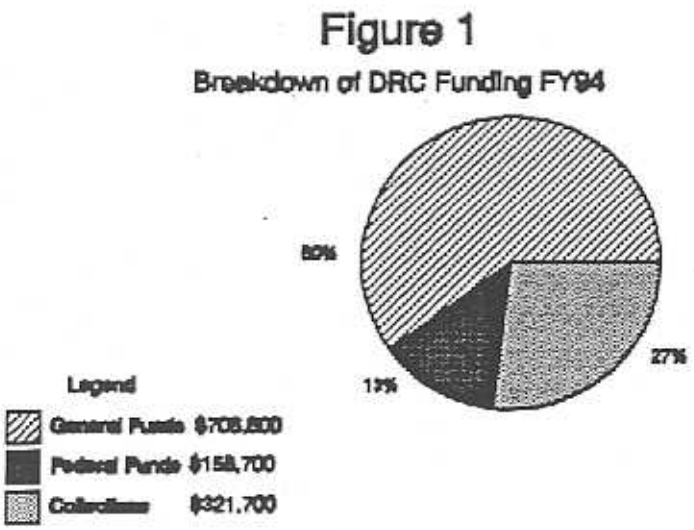
Alternatives to funding by disposal fees are an area that needs to be examined. One potential solution could be a guaranteed appropriated amount from the legislature each year. Disposal fees

would all be deposited in the General Fund whether the year results in either a surplus or shortfall.

TABLE 5-1 - DIVISION OF RADIATION CONTROL CURRENT FUNDING (FY94)

PROGRAM	FTE'S	TOTAL
GENERAL STATE	1.58	102,200
ENVIROCARE	6.87	320,500
INDOOR RADON	0.84	94,500
X-RAY REGISTRATION	5.83	304,900
RAD MATERIAL LICENSE	4.68	270,000
WIPP (WGA)	1.02	52,000
DIAG X-RAY INSPECTION	0.29	12,900
MEDICAID X-RAY INSPECTION	0.19	8,600
NESHAPS	0.27	19,300
TOTALS	21.61	$1,185,000

FIGURE 5-A



Brokers

Brokers accept waste from radioactive waste generators to store temporarily prior to movement to a disposal site. Normally, several small generators are gathered and then once a predetermined amount of waste is collected, it is shipped by transporter to a low-level waste disposal site. Brokers also provide services such as packaging waste for shipment to disposal sites, storage to allow for decay of short-lived radionuclides then disposal as solid waste, combining like wastes into a shipment, or compacting waste for shipment to a disposal facility.

Utah has one broker, Radiation, Safety and Nuclear Products Inc. (RSNP) located in Salt Lake City. RSNP is currently licensed to accept up to 3600 55 gallons drums of waste into storage for treatment by decay-in-storage. Typically these low-level wastes consist of radioactive medical products such as contaminated glassware, paper products, gloves, and absorbent materials of very low concentration and short half life. Typical radionuclides include iodine-125, iodine -131, and phosphorus 32. Under present Utah law, commercial treatment and disposal facilities are required to pay a fee of $2.50 per ton or fraction thereof of waste received at their facility. RSNP will be subject to the fee and as such represents a new funding source for the Division beginning in early 1994.

Potential Funds Generated Per Year:

Assumptions:
Maximum storage capacity - 3600, 55 gallon containers
Weight of 55 gallon container - 500 pounds
Maximum storage time of waste -
[For the shortest half life - Iodine-131 (8 days)] 8 days X 10 half lives = 80 days or 11.5 weeks
Turnover ratio of 4.5/year
3600 X 4.5 x 500# divided by 2000# X 2.25/ton = $9,112.50
[For the longest half life - Iodine-125 (60 days) 60 days X 10 half lives = 600 days or 86 weeks
Turnover ratio of 0 for year 1, 1 for year 2
Year 1 = 0
Year 2 = 3600 X 1 x 500# divided by 2000# X 2.25/ton = $2,025.00

Generators

Generators of low-level radioactive waste in Utah are limited to mostly academic institutions, research facilities, and governmental contractors and facilities. Information from the Northwest Interstate Compact indicates the following Utah generators:

Agridyne Technologies Inc.
Allied Clinical Laboratories
ARUP, Inc.
Brigham Young University
DataChem Laboratories
IOMED Inc.
NPS Pharmaceuticals Inc.
Theratech Inc.
Thiokol Corporation
U.S. Bureau of Mines
University of Utah
Utah State University
VA Medical Center
Westinghouse Electric Corp (Western Zirconium)

Two ways to raise revenue from generators are (1) a flat generator fee (2) a per ton fee collected from generators similar to the disposal fee collected from the commercial low-level waste site in Utah.

Potential Funds Generated Per Year:

(1) Flat Generator Fee:

Generator fees are normally assessed from a large universe. In the hazardous waste area, there are hundreds of large to small generators of waste. Low-level waste is much different in that there is a small, defined number of generators. In Utah, this number ranges from 10-15 in any given year. Certainly charging generators a fee would not only focus on a very small universe but would not raise significant revenue due to the small numbers. Generator fees are intended to shift the burden of fees payment to the generator of the waste such that the generator will have an incentive to minimize waste produced. Payment of generator fees does not exclude the paying disposal site fees required of Compact generators.

Assumptions:

14 Utah generators
Set annual fee payment

\$100 fee x 14(g)enerators = \$1,400/annually
\$250 fee x 14(g) = \$3,500/annually
\$500 fee x 14(g) = \$7,000/annually
\$1,000 fee x 14(g) = \$14,000 annually

(2) Generators Paying on a Per Ton Basis:

Another potential source of funding would be to have generators of low-level waste pay the disposal fee costs as indicated in the Radiation Control Act. This would require a change in the current Act to indicate the fee would apply to both Utah generators and any commercial disposal site. As with the per generator fee, because of the small universe of generators, little revenue would be produced.

Assumptions:

Low-level waste generated in Utah (cubic feet):
Assuming 1 cubic yard approximates 1 ton

1988	4672 divided by 3 = 1557 yards^3 x 2.25/ton = $3503
1989	6299 divided by 3 = 2100 yards^3 x 2.25/ton = $4725
1990	5338 divided by 3 = 1779 yards^3 x 2.25/ton = $4003
1991	7838 divided by 3 = 2613 yards^3 x 2.25/ton = $5879
1992	5380 divided by 3 = 1739 yards^3 x 2.25/ton = $3913

Commercial Site Access Fees

Generators of NORM, mixed, source, special nuclear material and byproduct low-level waste utilize the Envirocare facility as a preferred disposal site for their waste. Envirocare is assessed on a per ton basis for every waste received at their facility. Compact sites, such as Richland, Washington and Barnwell, South Carolina require that generators using their facility obtain a "generator permit" that allows them access to the facility. A similar concept could be applied to the Envirocare facility that would require that generators using the facility first obtain a generator access permit prior to the facility receiving waste from that generator. As such, a permit fee could be attached to receiving such permission. The permit fee could be assessed at least once for each generator entering the site or each time a generator shipped waste to the facility. Once again, a small number of generators utilize the Envirocare site which places an undue burden on the generators wanting site access to provide sufficient DRC funding for activities at the site.

Another possible scenario would be to charge generators based on a "per shipment" basis whereby the generator utilizing the site and disposal capacity would pay more in fees. A "per shipment" basis would be similar to the disposal fee concept except it would not be charged on a "per ton basis" but rather on a shipment basis. Thus, generators utilizing Envirocare would have to pay both a generator access fee on a per shipment basis as well as a disposal fee. An amendment to the Radiation Control Act or an addition to the legislative fees schedule would have to be implemented to add this as a revenue source.

Potential funds generated per year:

(1) Site imposed generator permit fee:

Assumptions:

28 generators using Envirocare during FY93 (Jul 92-Jul 93)
Permit fees could range from $100-1000 per generator
28 generators x $100 = $2,800
28 Generators x $1000 permit fee = $28,000

(2) Site "per shipment" generator fee:

Assumptions for site "per shipment" fee:
August 1992 shipments - 373
February 1993 shipments - 113
May 1993 shipments - 138
Range for FY93 -113-373, median 243 per month
Fees from $10 - $100 per shipment
243 shipments x $10 = $2,430
243 shipments x $100 = $24,300

Transportation Fees

Another potential source of funding could be assessment of a "permit" fee for vehicles hauling radioactive materials into or through the State of Utah. The universe could be further defined to cover only "waste" shipments through the State. Normally, transportation fees are assessed by individual state departments of transportation through a permit fee process. It is difficult to argue that such fees should benefit DRC as the main responsibility for transportation regulation rests with the Department of Public Safety. Therefore, this option will not be considered as a potential source of revenue for DRC.

Increase In Current Disposal Fees

Another source of increased revenue would be to increase the existing radioactive waste disposal fee. 19-3-106 of the Radiation Control Act specifies that fees currently are $2.25 per ton which will increase to $2.50 per ton on July 1, 1994. The disposal fees as specified in 19-3-106(d) are "to cover the cost of radioactive waste disposal supervision." The current budget specifies the need for $320,500 in collections to adequately fund the program for FY94, This does not include funding for additional program enhancements including groundwater expertise and additional licensing and compliance monitoring needs. A key to adequate funding in any year is based on waste receipts by the facility. In good business years, the DRC benefits from surplus funds, in

depressed business years, the DRC suffers because of lack of funding and must petition supplemental funds from the legislature or rely on other DEQ Divisions surplus money to fund the DRC shortfall.

DRC has been funded in two ways to date. Initially DRC was given a set amount per year to run the regulatory program for radioactive waste disposal. This was modified in 1991, to a "per ton" basis. The first years of the per ton basis produced adequate funding, but year to date for FY94 has DRC receiving to date $115,000 less than FY93. Through savings and other budgetary measures, DRC has been able to keep the shortfall relatively manageable to date. An increase in disposal fees may resolve the DRC funding issue for the long term. "Fees" need to continue to be designated for radioactive waste supervision and must not be used for other purposes if DRC funding is to remain stable.

Potential Funds Generated Per Year:

Assumptions:

Need 142,444 tons per to meet FY94 budget needs
11,870 tons per month needed to reach this base figure
Generates $26,708 per month of revenue
Using FY93 as a base, 200,000 tons per year are received
Increase in the fees to $3, 5, and 7 dollars based on the FY93 base tonnage of 200,000 tons
$2.25 x 200,000 tons = $450,000
$3/ton x 200,000 tons = $600,000 (+$150,000)
$5/ton x 200,000 tons = $1,000,000 (+$550,000)
$7/ton x 200,000 tons = $1,400,000 (+$950,000)

Increase In Registration Fees

Currently, machine-generated radiation devices on a per tube basis are required to annually register their device with DRC. The annual registration fee for hospital/clinic, medical/chiropractic/industrial/educational/other, podiatry/veterinary, and dental is $10.00 per tube. The FY94 X-ray registration/inspection program is budgeted at $304,900. Currently, collections from registration (assuming all registrants pay the fee) is as follows:

Total number of active/stored tubes per facility type

Clinics	173
Hospitals	564
Medical	167
Chiropractic	173
Industrial	216
Educational	51
Other	81
Veterinarian	146
Podiatry	68
Dentists	2594
Total	4233

4233 x $10.00 = $42,330
$42,330/304,900 = 13.9 % recovery from present budget

Potential Funds Generated Per Year:

Assumptions:

Using FY94 budget of $304,900 as the X-ray inspection program base
Provide 25% cost recovery of general fund monies by use of registration fees

$304,500 X .25 = $76,125

Clinics	173
Hospitals	564
Medical	167
Chiropractic	173
Industrial	216
Educational	51
Other	81
Veterinarian	146
Podiatry	68
Dentists	2594
Total	4233

4233 x $18.00 = $76,194
$76,194/304,900 = 25 % recovery from present budget

Increase In Inspection Fees

The Department of Environmental Quality fees schedule currently stipulates the following inspection fees for machine-generated radiation:

Hospital/Clinic	$115/tube
Medical/Chiropractic/ Industrial/Education/ Other	$105/tube
Podiatry/Veterinary	$75/tube
Dental	$45/first tube on a single machine $12.50/additional tubes

X-ray machine inspections are conducted at various frequencies:

Hospital/clinic	Annually
Medical/Chiropractic/ Industrial/Education/ Other	Every two years
Podiatry/Veterinary	Every five years
Dental	Every five years

Potential Funds Generated Per Year:

Assumptions:

To determine the actual fee to recover 50% of the program cost from inspection fees, it was assumed that each year 100% of the annual inspections would be completed, 50% of the 2 year rotation would be inspected and 20% of the 5 year rotation would be inspected. The fees were determined using only those tubes which are active.

Presently -

Total number of active tubes per facility type and fee grouping

Clinics (QE inspected)	93	
Hospitals (QE inspected)	512	605 x $15 = $9075
Total	605	
Clinics (State inspected)	77	
Hospitals (State inspected)	42	119 x $115 = $13,685
Total	119	

Medical		158	
Chiropractic		161	
Industrial		179	.5 x 622 = 311
Educational		44	311 x $105 = $32,655
Other		80	
Total		622	
Veterinarian		135	
Podiatry		66	.2 x 201 = 40.2
Total		201	40.2 x $75 = $1809
Dentists	Main	2312	.2 x 2312 = 462.4
	X-tra	215	462.4 x $45 = $20,808
Total		2527	.2 x 215 = 43
			43 x $12.50 = $537.50

Total inspection fees collected under assumptions: $78,569.50

Using the ratios presently in effect (ie: for QE reviews 15/115 = .13), assuming a recovery value of 50% from inspection fees and assuming that each year 100% of the annual inspections would be completed, 50% of the 2 year rotation would be inspected and 20% of the 5 year rotation would be inspected, the following equation was developed.

$$605(.13x) + 119(x) + 311(.91x) + 40.2(.65x) + 462.4(.39x) + 43(.11x) = \$152,450$$
$$x = \$220.35$$

Using $220 as the base fee, the following rates would be charged for each inspection:

Clinics/Hospitals (QE inspected)		$ 28.60
Clinics/Hospitals (State inspected)		$ 220.00
2 Year Rotation Facilities		$ 200.20
DVM/DP		$ 143.00
Dentists	Main	$ 85.80
	X-tra	$ 24.20

There is difficulty in dealing with the "odd cents" amounts so rounding the amounts to the following may be more reasonable.

Clinics/Hospitals (QE inspected)		$ 29.00
Clinics/Hospitals (State inspected)		$ 220.00
2 Year Rotation Facilities		$ 200.00
DVM/DP		$ 143.00
Dentists	Main	$ 86.00
	X-tra	$ 24.00

Using these fees, the amount collected would be as follows:

Clinics/Hospitals (QE inspected)		$ 29.00 x 605	= $ 17,545.00
Clinics/Hospitals (State inspected)		$ 220.00 x 119	= $ 26,180.00
2 Year Rotation Facilities		$ 200.00 x 311	= $ 62,200.00
DVM/DP		$ 143.00 x 40.2	= $ 5,748.60
Dentists	Main	$ 86.00 x 462.4	= $ 39,766.40
	X-tra	$ 24.00 x 43	= $ 1,032.00
Total			= $152,472.00

152,472/304,900 = 50% of program costs recovered from inspection fees.

Increase In Licensing Fees

Public law 101-508, the Omnibus Budget Reconciliation Act of 1990, enacted November 5, 1990, required that the Nuclear Regulatory Commission (NRC) recover approximately 100 percent of its budget authority less the amount appropriated from the Department of Energy administered Nuclear Waste Fund, for FYs 1991 through 1995, by assessing fees to NRC applicants and licensees. Public Law 101-576, the Chief Financial Officers Act of 1990 (CFO Act), enacted November 15, 1990, requires that the NRC perform a biennial review of its fees and other charges imposed by the agency and revise those charges to reflect costs incurred in providing those services.

The NRC assesses two types of fees to recover its budget authority. First, license and inspection fees, recover the NRC's cost of providing individually identifiable services to specific applicants and licensees. The services provided by the NRC for which these fees are assessed are generally for the review of applications for the issuance of new licenses or approvals, amendments to or renewal of licenses or approvals, and inspections of licensed activities. Second, annual fees recover generic and other regulatory costs not recovered through other fees. Professional rates charged by NRC are $132/hour.

NRC does not provide direct grant dollars to State Agreement Programs such as Utah. Agreement States are expected to charge the necessary fees, as NRC, to adequately fund their programs. Most state programs do not collect fees in the "spirit of NRC" to reach 100% cost recovery. Listed in Table 5-2 are typical recovery rates of Agreement States:

TABLE 5-2 - FEE RECOVERY RATES OF AGREEMENT STATES

State	% recovery of program costs
Arizona	75%
California	95%
Florida	100%
Kansas	25%
Kentucky	43.7%
Louisiana	80%
Mississippi	97%
Nebraska	35%
North Carolina	27%
New Hampshire	21%
Oregon	81%
South Carolina	78%
Tennessee	100%
Texas	83%
Utah	25%

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Utah fees for licensing radioactive material are published in the Department of Environmental Quality fee schedule. See Table 5-3 for a comparison of certain Utah and NRC fees for licensed uses of radioactive material.

FY94 budget for licensing of radioactive material is $270,000, of which approximately 25% or $67,500 is recovered annually through fees assessment.

Potential Funds Generated Per Year:

Assumptions:

Increase of 25% of fees collection to generate 50% recovery of program fees

TABLE 5-3 - COMPARISON OF UTAH RADIOACTIVE MATERIAL LICENSING FEES AND NRC LICENSING FEES

Category	Utah fee	NRC fee[1]
All other special nuclear material licenses Application/new license: Annual fee:	 $575.00 $400.00	 $590.00 $420.00
All other source material licenses Applications/new license: Annual fee:	 $575.00 $400.00	 $2,500.00 $1,300.00
Licenses for possession and use of radioactive material for research and development Application/new license: Annual fee:	 $350.00 $235.00	 $4,100.00 $2,200.00
Well logging Licenses for possession and use of by-product material and/or special nuclear material for well logging, well surveys, and tracer studies other than field flooding tracer studies Applications/new licenses: Annual fee:	 $835.00 $525.00	 $3,700.00 $3,900.00
Licenses for possession and use of byproduct material, source material, or special nuclear material for civil defense activities Applications/new licenses: Annual fee:	 $350.00 $95.00	 $660.00 $700.00
Reciprocity	Full annual fee for specific category of user listed above	$700 per application (each filing of Form 241)

[1]NRC, in addition to applications for new license fees and annual fees, also collects inspection fees.

TABLE 5-4 - COMPARISON OF FUNDING ALTERNATIVES

Funding alternative	Universe	Funding potential on an annual basis
Broker fees	1	$2,025 - 9,112.50
Utah Generator fees	14	By volume: $3,503 - 5,879 Per Generator: $1,400 - 14,000
Commercial site access fees	28 243	By generator: $2,800 - 28,000 Per shipment: $2,430 - 24,300
Transportation fees	Unknown	Not under consideration, Dept. of Public Safety responsibility for radioactive materials transportation compliance
Increase in current disposal fees	Currently $2.25 per ton	$2.25/ton generates $450,000 annually based on receipt of 200,000 tons/year Increase to $3/ton: +$150,000[1] Increase to $5/ton: +$550,000 Increase to $7/ton: +$950,000
Increase in registration fees	Currently $10 per tube	$10 per tube provides 14% funding of FY94 X-ray inspection program To provide 25% funding of FY94, the per tube fee would have to be raised to $18.00/tube
Increase in inspection fees for registrants	Currently $115/tube - hosp/clinics $105/tube - medical/chiropractic/academic/industrial/other $75/tube - veterinary/podiatry $45/first tube, 12.50 additional tubes - dental	Current fee schedule provides 26% funding for the X-ray inspection program To provide 50% funding of FY94 monies, the inspection fees would have to be raised as follows: Dental - $86, $24/extra tube Hospitals/clinic (QE inspected) $29 Hospitals/clinic (State inspected) $220 2 Year Rotation facilities $200 Veterinary/Podiatrists $143
Increase in licensing fees for licensees	220 licensees	Increase all fee categories by 25%, results in $67,500 increase for a total yearly collection of $135,000.

[1]Represents the increase over the current disposal fees received on an annual basis assuming the same tonnage received during FY93.

PERPETUAL CARE FUND FOR POST-CLOSURE AT COMMERCIAL RADIOACTIVE WASTE FACILITIES

Another important issue concerning funding issues relates to liability for state licensed disposal sites such as Envirocare. While site surety for closure and post-closure monitoring and maintenance has been addressed, post-closure liability appears to be a gap in the regulatory system. A post-closure clean-up or "perpetual care" fund should address the contingency of a true worst-case scenario such as engineering failure of a closed disposal cell or a groundwater contamination event that requires remediation. Existing low-level waste sites in South Carolina and Washington rely on a portion of disposal fees to build up their closure/post closure accounts. While these sites have large pools of money available, the closure and post-closure process is not as well-defined in the Envirocare closure/post-closure plans.

This particular issue, addressed in the December 1992, Performance Audit of the Utah Department of Environmental Quality, was identified as one issue that needs to be addressed by the Utah legislature. A recommendation of the audit report:

> *"We recommend the Legislature consider statutory inclusion of waste disposal fees for possible funding of site surety and liability accounts."*

The Department of Environmental Quality will introduce legislation during the next session to address this issue. Certainly other mechanisms besides disposal fees are available to resolve this issue and will be explored in detail prior to making a final recommendation to the Legislature.

ELEMENT 6 (19-3-107(2)(f)

ADDRESS OTHER RADIOACTIVE WASTE MANAGEMENT CONCERNS THAT THE BOARD FINDS APPROPRIATE FOR THE PRESERVATION OF PUBLIC HEALTH AND THE ENVIRONMENT

- Description of radioactive waste transportation concerns and risk
  (How much detail should be included, releasing too much information to the public may be imprudent; how will Utah interact with other states and federal agencies in matters related to interstate transport)
- Discussion of State Agreement status with NRC/assumption of primacy for uranium mill tailings
- Discussion of remediation wastes and alternate means of disposing of remediation wastes
- Discussion of MRS/Goshute Indian Tribe proposal
- Discuss Below Regulatory Concern (BRC) issue as it relates to Utah
- Board policy regarding kinds and concentration levels of radioactive wastes are acceptable and what kind of facilities Utah should have (from Envirocare audit report)
- Actions by other states or the federal government that impact Utah's management of radioactive waste

RADIOACTIVE WASTE TRANSPORTATION

Each year, hundreds of truck shipments of radioactive materials travel through Utah without incident. Local, state, and federal agencies cooperate in enforcing strict controls for shipping radioactive materials. As a direct result, the few accidents in Utah have been minor and none has resulted in the release of radioactive material. Nationwide, the transport record is just as impressive. While there have been several severe accidents during the transportation of radioactive materials, no one has ever been injured or killed because of the materials present.

There are vast amounts of radioactive waste temporarily stored in this country with more generated daily. Finding safe permanent disposal sites is a necessity. Although additional planned disposal sites are not in Utah, many of the shipments must pass through the State. The transportation of these materials will remain an issue in the future. Through the continued efforts of private industry, and under the stringent oversight of government agencies, the public can be assured that these activities will proceed safely.

WASTE ISOLATION PILOT PROJECT (WIPP)

The nuclear weapons program produced an enormous amount of radioactive waste. Most of the waste is now stored at ten Department of Energy (DOE) sites located nationwide. Wastes generated or stored by two western sites, Hanford, Washington and the Idaho National Engineering Laboratory (INEL) will transport waste through Utah enroute to the WIPP near Carlsbad, New Mexico. The WIPP is a research and development facility to demonstrate the safe disposal of transuranic wastes that had been generated during U.S. defense programs at other Department of Energy sites.

DOE contractors constructed WIPP to demonstrate safe disposal of this radioactive material. The WIPP project will have a 25 year operational life. For the first five years, scientists will evaluate the possibility of safely storing the transuranic waste in salt formations 2,150 feet underground. During the first five years of the test period, there will be approximately one or two truck shipments through Utah per week. The Utah corridor consists of waste coming through northern Utah entering by I-15 or I-84 and exiting Utah on the east at Evanston, Wyoming.

The project has three planned operational phase; test, disposal, and decommissioning. During the first five year phase, safe disposal will be evaluated. This test phase must verify compliance with environmental standards prior to commencement of disposal operations. The Environmental Protection Agency will participate in the review process.

The waste will be shipped in a specially designed container called TRUPACT II. TRUPACT II is a grey cylinder, approximately eight feet in diameter and ten feet tall with a flat bottom, a domed top, and is capable of carrying fourteen 55 gallon drums or standard waste bins. Ten inches of polyurethane foam separates the two containment vessels from the thicker stainless steel shell and will absorb impacts from accidents, thereby limiting damage to the inner vessels. Up to three containers will be carried on a flat bed trailer transported by a conventional tractor. The cargo will display diamond-shaped placards to alert other drivers and emergency crews in case of an accident. The payload for each trailer will not exceed Department of Transportation weight requirements. DOE requires each truck to have two drivers and have

two-way communication and emergency response equipment on board. At rest or truck stops, one driver must always maintain visual contact with the vehicle. The carrier is allowed to stop only at state-approved locations along the route. In the event of bad weather or road closure, the Utah Highway Patrol will advise the driver of appropriate detours, temporary parking areas, and other precautions.

Accidents are always possible. The goal is to minimize the risk. The national track record on transporting radioactive materials is impressive. Stringent rules developed in a cooperative effort with local, state and federal agencies assures the public that the transport will be safe and that trained responders are ready in the unlikely event an accident occurs.

Municipal and county officials coordinate regularly with the Utah Division of Radiation Control, the Utah Department of Public Safety, and the Utah Department of Transportation to develop and implement procedures to make response efforts swift and effective. Routine "mock" accidents are staged to train fire fighters, police, EMTs, highway crews and others who could be first at the scene. Specialists along major routes have received advance training and the proper equipment to detect radiation.

Utah is also an active participant in the WIPP Cooperative Agreement administered by the Western Governor's Association. Working with other western states, Utah participates in reviews and comments on shipment plans, procedures, equipment, training and other elements of the WIPP transportation program. Recommendations and changes made to date include supplementary package testing, driver quality assurance strategies, vehicle inspection procedures, emergency notification procedures, and foul weather plans.

Many high level and transuranic waste shipments will transit Utah in the future. Information learned during WIPP exercises and continued participation in the WIPP Cooperative Agreement will also help prepare Utah for these and other radioactive waste shipments.

THE ROLE OF THE STATE OF UTAH IN LOW-LEVEL WASTE MANAGEMENT: THE STATE AGREEMENT PROGRAM

In 1980, Congress passed the federal Low-Level Radioactive Waste Policy Act which assigned states the legal responsibility to provide or arrange for disposal of low-level waste (LLW) produced within their boundaries. This requirement to manage and dispose of LLW is different from the regulatory responsibility over radioactive materials and LLW. States are mandated by federal law to provide for disposal; it is not optional to regulate materials and waste.

Utah is required to provide for disposal capacity of LLW. This has been provided for Utah by becoming a member of the Northwest Interstate Low-Level Radioactive Waste Compact which allows Utah capacity at the designated compact site in Richland, Washington. Utah has also established waste capacity for low concentration radioactive wastes at the Envirocare facility. The Envirocare facility currently can dispose of mixed waste, source, byproduct, and special nuclear material with classification of no higher than Class A low-level waste, naturally occurring and accelerator produced radioactive material (NARM) waste, and capacity is currently being developed for uranium mill tailing (11.e(2)) waste. Utah has also developed stringent siting criteria for siting of any new low-level radioactive waste facilities.

Utah is an agreement state; a federal-state partnership in the management of radioactive materials and LLW. The Agreement State program of the Nuclear Regulatory Commission (NRC) allows states to take responsibility for the control of one or a combination of five categories of radioactive materials or sources. These include:

(1) source materials;

(2) special nuclear materials in small quantities;

(3) byproduct materials;

(4) uranium mills and mill tailings defined by the Uranium Mill Tailings Radiation Control Act of 1978; and

(5) LLW disposal (excluding mill tailings).

Some radioactive materials are not regulated by NRC and therefore are not included as part of the Agreement State program. Examples include Naturally-Occurring (NORM) and Accelerator-Produced Radioactive Materials (NARM) such as radium and gallium-67. Utah has adopted rules to cover disposal of these materials.

To date, there are 29 Agreement States as shown in Table 6-1

TABLE 6-1
AGREEMENT STATES

Alabama	Georgia	Maine	New Mexico	South Carolina
Arizona	Illinois	Maryland	New York	Tennessee
Arkansas	Iowa	Mississippi	North Carolina	Texas
California	Kansas	Nebraska	North Dakota	Utah
Colorado	Kentucky	Nevada	Oregon	Washington
Florida	Louisiana	New Hampshire	Rhode Island	

Agreement states regulate users of radioactive materials, except for federal facilities and nuclear power plants, which remain under the control of the NRC. Agreement States receive on-going training and technical support from the NRC. By entering into an agreement to regulate a combination of the agreement materials, a state becomes a "full" Agreement State. By agreeing only to license and regulate a LLW disposal facility, a state becomes a "limited" Agreement State. Currently, only Maine has opted for limited status although Pennsylvania has applied for a limited agreement. Utah has opted to participate as an agreement state except for uranium mills and mill tailings defined by the Uranium Mill Tailings Radiation Control Act of 1978. At the present time, it is not anticipated that Utah would pursue agreement state status for the uranium mill tailings program. Utah's involvement would be working closely with the Uranium Recovery Field Office (URFO) in Denver on licensing and inspection issues relating to Utah uranium facilities. Upon closure of the URFO office, licensing activities would be

coordinated with NRC Headquarters staff and inspection/enforcement activities would be coordinated with NRC Region IV staff.

Actions necessary to become an Agreement State are outlined in Table 6-2.

TABLE 6-2
Actions Necessary to Become an Agreement State

1. Enactment of a enabling legislation to establish regulations necessary to assume regulatory authority over byproduct, source, and small quantities of special nuclear materials.

2. Authorization of the Governor to enter into an agreement with NRC under section 274 of the Atomic Energy Act to allow Utah to become an Agreement State.

3. Adoption of Utah rules to govern radioactive materials allowed under the Agreement State Program.

4. Hiring the necessary personnel to meet NRC requirements for licensing, inspection, and enforcement.

5. Working formally with NRC to ensure the state program will meet NRC standards.

6. Governor's certification that the state's radiation control program is "adequate to protect public health and safety."

7. NRC's independent evaluation and finding that the state's program is "adequate" and "compatible", publication of this finding in the Federal Register authorizing the state to assume regulatory control as an Agreement State.

8. Reviews by the NRC of the state's program, conducted every 18 months (or more frequently, if necessary).

As indicated in Table 6-2, two sets of program indicators are used by NRC in making a determination of adequate and compatible. Category 1 indicators encompass program functions which directly relate to the state's ability to protect public health and safety. They include:

Legal Authority - Utah laws must exist and clearly designate a state radiation control program and its authority to promulgate regulations for licensing, inspection, and enforcement.

Quality of Emergency Planning - The Division of Radiation Control (DRC) must have a written plan for responding to incidents such as spills, overexposures, transportation accidents, fires, explosions, etc.

Technical Quality of Licensing Actions - DRC must ensure that license applications contain essential elements which properly describe the radioactive isotopes and quantities to be used, the qualifications of the individuals who will use the radioactive materials, etc. DRC must have procedures for reviewing licenses prior to renewal to ensure licensee compliance.

Status of Inspection Program - DRC must maintain an inspection program adequate to assess licensee compliance with Utah rules and license conditions.

Inspection Frequency - DRC must establish an inspection priority system and base the frequency of inspections on the potential hazards of licensed operations.

Inspectors' Performance and Capability - Inspectors must be competent to evaluate the health and safety problems and determine compliance and non-compliance with Utah rules.

Response to Actual and Alleged Incidents - DRC must be prompt in evaluating the need for on-site investigations and completing investigations.

Enforcement Procedures - Enforcement procedures must be sufficient to provide a substantial deterrent to license noncompliance.

Category II indicators are used by NRC to determine a successful Agreement State program. These indicators address technical and administrative support for major program functions and include:

Legal Assistance - Legal staff which is knowledgeable about Utah's radiation control program, its laws and regulations, must be assigned to the program.

Budget - Funds to operate Utah's radiation control program must come from continuous and reliable sources, such as a state's general appropriations or fees charged licensees. Financial resources need to be sufficient to support all program needs, including staff travel for inspection and monitoring, emergency response and other activities.

Licensing and Inspection Procedures - DRC must develop licensing and inspection guides consistent with NRC practice.

As a result of a series of articles in the Cleveland Plain Dealer regarding misadministrations, and Congressional hearings held by Congressman Mike Synar (D) - Oklahoma, the NRC is re-evaluating the above indicators to judge a successful radiation control program. The new criteria are currently being circulated and discussed and will most likely result in additional requirements that an Agreement State such as Utah must meet to maintain an adequate and compatible status.

Low-level Waste Management under an Agreement State program gives Utah authority to:

(1) enforce transportation and packaging requirements which must be consistent with DOT

(2) license NARM material and determine the requirements for disposal;

(3) regulate mixed waste;

(4) identify sites for storage, treatment, and disposal facilities;

(5) assist a host community in its selection of a facility operator and facility technology;

(6) participate in negotiations with the facility operator and the site community regarding compensation and benefits;

(7) undertake other activities relating to facility development, operation, closure, and institutional control, as owner of the facility property;

(8) review and comment on actions by NRC to license both users of radioactive materials and facilities for storage, treatment, and disposal;

(9) regulate the users of radioactive materials, including licensing the use of specific radionuclides and inspecting the users' facilities, waste generation, packaging, source and waste volume minimization activities and shipping papers;

(10) regulate facilities for the storage, treatment and disposal of LLW waste, including granting (or denying) licenses, regulating facility operations, closure, institutional control, inspection, monitoring, radiation control and enforcement; and

(11) conduct environmental reviews necessary for facility licensing.

However, under the federal state agreement, Utah does not have authority to regulate:

(1) uranium mills and mill tailings;

(2) military installations;

(3) federal agencies under a U.S. Nuclear Regulatory Commission license or the U.S. Department of Energy; and

(4) prime contractors or subcontractors of the U.S. Department of Energy or the U.S. Nuclear Regulatory Commission.

THE FEDERAL ROLE IN LLW MANAGEMENT

The major federal agencies and their regulatory authorities are:

U.S. Nuclear Regulatory Commission

The NRC receives its authority from the Atomic Energy Act as well as the Energy Reorganization Act of 1974. NRC controls the use and management of most radioactive materials and LLW and promulgates regulations for:

- standards to protect against radiation hazardous for those licensed to use radioactive materials [10 Code of Federal Regulations (CFR) Part 20]

- general rules for licensing byproduct materials [10 CFR 30 and 31]

- licensing the manufacture or transfer items containing byproduct material [10 CFR 32]
- medical use of byproduct material [10 CFR 35]
- licensing and radiation safety requirements for well logging [10 CFR 39]
- licensing the use of source material [10 CFR 40]
- requirements for the disposal and storage of high-level radioactive waste and spent nuclear fuel [10 CFR 60 and 72]
- licensing nuclear-powered electric generating facilities and the operators of such facilities [10 CFR 50 and 55]
- environmental regulations followed by NRC under the requirements of the National Environmental Policy Act (NEPA) [10 CFR 51]
- requirements for licensing LLW disposal facilities [10 CFR 61]
- licensing the use of special nuclear material [10 CFR 70]
- packaging and transportation of radioactive material [10 CFR 71]

U.S. Department of Energy

U.S. Department of Energy as authorized by the Atomic Energy Act of 1954, the Low-Level Radioactive Waste Policy Act of 1980, and its Amendments of 1985, is the lead federal agency for LLW management. Its responsibilities include assisting states, LLW generators, the scientific community, local governments and interested organizations in implementing a national LLW management system. DOE runs its National Low-Level Management Program through its Idaho Operations Office and its lead federal contractor, EG&G Idaho, Inc.

Among the activities of DOE's management program include funding an organization of state officials, known as the LLW Forum, which meets quarterly to discuss LLW management policies. DOE also provides technical assistance to states on a range of LLW management issues.

U.S. Department of Transportation

In addition to NRC, the U.S. Department of Transportation (DOT) is responsible for regulating the transportation of radioactive materials and LLW. In contrast to NRC's responsibility for packaging and containment of waste comprising large quantities of radioactivity, DOT is responsible for packaging and shipping standards for certain radioactive materials and for general requirements on labeling, placarding, handling and highway routing of radioactive materials and waste. Its regulatory authority includes the Department of Transportation Act of 1966, the Hazardous Materials Transportation Act of 1975, and its amendments, and the Hazardous Materials Transportation Uniform Safety Act of 1990.

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) under the authority of AEA is responsible for setting radiation standards that limit the levels of radiation exposure to the general public from the management of LLW. These include regulating radiation levels in air emissions and drinking water standards. Standards are authorized under several federal laws including the Clean Air Act Amendments of 1977, the Safe Water Drinking Act (1974) and the Federal Water Pollution Control Act (Clean Water Act) of 1962.

EPA regulates the hazardous waste component of mixed waste pursuant to the provisions of the Hazardous and Solid Waste Amendments of 1984 (HWSA). This waste termed "mixed waste" is restricted from disposal in the two operating low-level compact sites because these sites do not meet certain restrictions for the land disposal of hazardous waste. Utah's Envirocare facility is authorized to accept certain "mixed waste" and is currently the only commercial mixed waste facility in the United States. Mixed waste regulation is the responsibility of the State of Utah for both the radioactive and hazardous waste components.

In addition to the above-cited authority, EPA also has responsibility for the cleanup of hazardous waste sites containing radioactive contaminants under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA) of 1983, and the Superfund Amendments and Reauthorization Act (SARA) of 1989.

U.S. Geological Survey

The U.S. Geological Survey (USGS) provides other federal agencies and states with technical evaluations of geology and hydrology relating to the disposal of LLW.

U.S. Department of Labor

Under the provisions of the Occupational Safety and Health Act of 1970, the U.S. Department of Labor (DOL) sets occupational standards for the safe handling of radioactive materials and LLW by workers at licensed locations.

MANAGEMENT OF RADIOACTIVE WASTES REQUIRING REMEDIATION

Radioactive waste that results in remediation waste in Utah is generated primarily from two sources. Users of radioactive materials are required to decommission (close) areas where radioactive materials have been used, stored, treated, or disposed. The decommissioning of these facilities requires:

(1) Submission of a decommissioning plan or termination survey reports to DRC

(2) Review and approval of decommissioning plan or survey reports by DRC

(3) Implementation of approved decommissioning plan or termination of license from survey report data review.

(4) Confirmatory inspections by DRC of decommissioning plan implementation and success of decontamination efforts.

License terminations issued by DRC:

1990 - 14
1991 - 21
1992 - 15

The other major source of radioactive waste in Utah that eventually requires remediation is generated from uranium milling and mining. The major uranium mills and remediation projects are:

ATLAS URANIUM MILL TAILINGS CLEANUP

History:

- The Uranium Reduction Company (URC) built the Moab Mill and began milling operations in October 1956, initially processing ores from southeastern Utah.
- Atlas acquired URC in 1962, and operated the Moab Mill until operations ceased in April 1984.
- In the 70's Atlas rebuilt the mill to handle vanadium ores and supply yellowcake to the commercial nuclear power industry.
- Atlas maintained the mill on a stand-by status until 1988, when it was formerly closed.
- Atlas began dewatering the tailings and in August 1989, began placing the interim/final cover on the tailings impoundment.
- Decommissioning activities have been ongoing since 1988, and were accelerated in 1992, when American Reclamation and Dismantling was contracted. The mill buildings are currently being torn down.
- The 130 acre tailings pile contains approximately 10.5 million tons of material. Approximately 5.9 million tons or 56% of the tailings resulted from federal government contracts. Under recent legislation, the federal government is expected to reimburse the licensee for that portion of the reclamation costs.

Mill Decommissioning and Tailings Reclamation:

- Original plan prepared in 1981, and was accepted by the NRC on June 30, 1982, and later described in the license renewal application submitted to NRC in 1984.

- In 1987, Atlas submitted a mill decommissioning plan that was approved by NRC on November 28, 1988 (significantly revised due to new standards and guidelines).

- In January 1989, Atlas responded to NRC comments on the mill tailings reclamation plan and submitted technical specifications.

- Atlas was asked to revise the plan again in November 1991, due to further changes in regulatory guidance.

- Canonie Environmental Services Corp., an engineering firm with extensive experience with reclamation design of uranium mill tailing sites, developed the design of the 1988 and 1992 plans.

- Atlas submitted the revised 1988 reclamation plan in June 1992 (the 1992 Reclamation Plan)

- NRC concluded that the revised 1992 reclamation plan, and supplemental information on environmental concerns submitted by Atlas should result in a Finding of No Significant Impact (FONSI) in regards to environmental concerns and that the on-site reclamation plan should be approved. The NRC decision was published in the Federal Register of July 20, 1993, which triggered a 30-day public comment period which expired August 19, 1993.

Recent Developments:

- NRC provided the State of Utah and the Grand County Council with copies of the NRC technical support documents after notice of the NRC decision was published in the Federal Register. The State and Grand County issued comments which supported the position that an Environmental Impact Statement was necessary.

- After initial review of the comments submitted by the Grand County Council, concerned citizens, the State of Utah, the National Park Service, and the Environmental Protection Agency, NRC decided to withdraw the FONSI decision. This was published in the Federal Register on October 8, 1993.

- NRC has established a technical committee to review the Atlas decision.

    - On October 1, 1993, NRC Headquarters staff (Low Level Waste Management and Decommissioning Division) met with staff of the NRC Uranium Recovery Field Office (URFO) office in Denver to discuss the workings of the technical committee

    - On October 4 and 5, 1993, another meeting was held in Denver with representatives of the NRC, the State, Grand County, and the National Park Service. As explained to the group by NRC, this peer review of the technical aspects of the proposed reclamation action is just the first step in the NRC review process. Once a reclamation in-place design is finalized and the NRC is satisfied it meets 10 CFR 40 App. A requirements, this will serve as a base case design for the comparison of alternatives. The second step concerns the Environmental Assessment and a proper evaluation of reclamation alternatives, including an updated cost analysis. Atlas is working on updating of the alternatives, but the NRC will review Atlas's figures.

The NRC wants to complete the technical peer review and create a new TER (technical evaluation report) by May 1994. The second step involving the EA and comparison of alternatives will occur during a longer time frame, and a final schedule has not been set. The end result will be a decision by NRC to either accomplish a supplemental Environmental Assessment or conduct a new Environmental Impact Statement (EIS).

Four technical working groups were formed. These included groundwater, geotechnical, erosion protection and geology/geomorphology. Another group was formed to work on the environmental assessment issues including a relook at the alternatives.

- On October 7, 1993, a site tour of Atlas was conducted followed by a trip to the alternate sites (Klondike Flats and site at the entrance to Dead Horse Point road). Following the "tours", a wrap up meeting was held at the county courthouse. Participants were Rich Blubaugh, Michael Gross, and Steve Manz of Atlas (Steve is new President and CEO of Atlas), Superintendents of both Arches and Canyonlands National Park, Peter Heaney and Lance Christy of the Grand County Council, Paul Louhaus, Mike Fleigle, and other technical staff from Low-level Waste/Decommissioning, NRC-Washington, Ramon Hall from NRC Uranium Recovery Field Office and a couple of his technical staff, and Bill Sinclair of the Utah Department of Environmental Quality.

- A meeting of the technical working group was held on October 26, 1993, in Denver, Colorado. Periodic public meetings are expected to be scheduled by the NRC as the review progresses; but specific dates have not yet been established.

MONTICELLO URANIUM MILL TAILINGS CLEANUP

Current Status:

- The uranium mill was operated by the federal government and contract operated, excluded under Title I of the Uranium Mill Tailings Radiation Control Act of 1968.

- The tailings from the mill were commonly used as fill material for foundations in the town of Monticello.

- Department of Energy (DOE) is the responsible party for remediating the site and DOE handles the project from their Grand Junction, Colorado projects office.

- CERCLA Record of Decision was to encapsulate the tailings south of the mill site, original cost estimate was $50-60 million dollars. Since the State of Utah groundwater protection standards apply as a appropriate, relevant, applicable rules in the CERCLA process, cost estimates now range from $120-220 million dollars. This has made Superfund look at other alternatives.

Other Alternatives:

(1) Commercial disposal

(2) Disposal at NRC licensed facilities

(3) New disposal sites

Currently Looking at Six Alternatives:

-3 different locations near the current site which is better suited from a hydrogeologic standpoint

-cap in place

-NRC licensees:
-Rio Algom - north and east of Monticello, Utah (under ground water corrective action)
-UMETCO - Blanding, Utah

Division Involvement:

- Currently involved in reviewing Remedial Action Assessments (REA) for peripheral properties - our time is billed to CERCLA/Monticello
- Review of completion reports and sign off on contractor's work
- Conduct radiological surveys of remediated properties (10%) to validate the contractor's (Chem Nuclear Geotech) results
- 1,075 homes surveyed, half have been excluded from any needed cleanup

Current Developments:

- SUPERFUND Record of Decision (ROD) was to encapsulate the tailings south of the mill site on property purchased by the Department of Energy, original cost estimate was $50-60 million dollars. Since the State of Utah groundwater protection standards apply in the CERCLA remediation process, cost estimates now range from $120-220 million dollars for that remediation alternate. This has made Superfund look at other alternatives including:
  (1) Commercial disposal
  (2) NRC licensees
  (3) New disposal sites
- On August 4, 1993, DOE announced at a public meeting at Monticello, Utah that the UMETCO White Mesa Uranium Mill was now the preferred alternative for disposing of the tailings.
- There have been subsequent meetings between the State of Utah (State Superfund, Division of Radiation Control), DOE, EPA Region VIII, and the Nuclear Regulatory Commission to study the feasibility of the White Mesa Mill alternative.

- Issues that have been identified to date include:

  - Receipt of non 11e.(2) material at UMETCO - since the tailings are intermixed with vanadium, they are technically not 11e.(2), NRC would allow DOE to petition NRC on behalf of UMETCO to gain a site specific decision on whether this intermixed waste could be accepted at the White Mesa Mill.

  - EPA needs to resolve if they can release the "waste" to NRC as it goes through the gate, initial determinations are that EPA can capitulate to other regulatory authority (a NRC licensee in this case).

  - EPA will need some assurances from NRC that the site is "in compliance" (e.g. groundwater) to meet the CERCLA off-site policy concerns.

  - NRC will need some assurances from EPA that the receipt of CERCLA waste by this NRC licensee (which will eventually become DOE responsibility) will not subject the DOE/NRC to future CERCLA liabilities.

OPERATIONAL URANIUM MILLS

Plateau Resources

The Plateau Resources Limited Shootering Canyon Uranium Processing Facility, located near Ticaboo, Lake Powell, Utah, is currently in an interim shutdown basis.

UMETCO White Mesa

The UMETCO White Mesa uranium processing mill is located in Blanding, Utah. The mill is presently licensed by NRC and is allowed to produce 4,380 tons of ore on an annual basis. The mill is currently on a standby status. A production run is expected during the last quarter of 1994. The site consists of the uranium processing facilities and structures as well as a tailings disposal area.

Rio Algom

Rio Algom Mining Corporation is located on La Sal Route in San Juan County, Utah. Rio Algom is also on a standby status. Recently, NRC approved a reclamation plan for the uranium mill tailings disposal area which includes a groundwater corrective action program.

COMPLETED CLEANUPS
GREEN RIVER AND VITRO URANIUM MILL TAILINGS

Two sites, the Green River site in Green River, Utah and the Vitro tailings site in Salt Lake City, Utah, have been successfully remediated. The Vitro tailings were moved to 100 acres of the section of land,

of which Envirocare later purchased the remaining 540 acres for its disposal facility site near Clive, Utah. The Green River tailings were stabilized on-site.

MONITORED RETRIEVABLE STORAGE (MRS) PROPOSAL FOR UTAH: THE GOSHUTE INDIAN RESERVATION

Monitored Retrievable Storage (MRS) is an intermediate step to the permanent disposal of used nuclear fuel (high level nuclear waste). An MRS facility would receive used nuclear fuel from nuclear power plants throughout the United States and store it temporarily above-ground until a permanent high level waste repository is ready. The concept is that the used fuel will be carefully monitored at all times and it could be removed (hence the word "retrievable" in the name) at any time. At the nuclear power plants, used nuclear fuel would be loaded into specially designed transportation casks using remote-controlled equipment and cranes. These casks would be transported by rail or truck to the MRS facility.

The MRS facility should appear as a low-rise industrial park. It would occupy several hundred acres, although most of that would be open land- a buffer zone between the facility itself and the perimeter of the site. The site would be enclosed by fence and monitored by a security force. Access would be strictly controlled. A MRS facility would likely store used nuclear power plant fuel in massive steel casks. The form of storage is often called "dry" storage - to distinguish it from the water-filled concrete and steel pools in which used fuel is placed when it is first removed from a nuclear reactor. The storage cask is 16-17 feet tall and 8-9 feet in diameter. The steel walls are 9-10 inches thick. The top and bottom are 11-12 inches thick.

In 1987, Congress created an independent federal entity called the Office of the Nuclear Waste Negotiator. It is not part of the Department of Energy or any other federal agency. The Negotiator is nominated by the President, approved by the U.S. Senate and answers only to the U.S. Congress. The position of the Nuclear Waste Negotiator is currently vacant. Former Congressman Ronald Sims of Idaho has been nominated by President Clinton, but has not been confirmed by the Senate. The mission of the Negotiator is to open a dialogue with state governors and leaders of Indian tribes, and to explore the terms and conditions under which their citizens might be willing to host an MRS Facility. Congress recognized in 1987, that states and Indian tribes might be interested in MRS, but might not have the money to study the issues properly. As a result, states and Indian tribes can apply for cash grants to do such studies.

The Goshute Indian Tribe in Utah, 113 members strong, has already spent $300,000 in federal money studying the issue and has applied for $2.8 million (called a phase IIb grant) more to conduct environmental and technical assessments on the feasibility of building a MRS facility to store up to 15,000 metric tons of spent nuclear fuel. The facility would be proposed for the Goshute Skull Valley Indian Reservation located in Tooele County, Utah.

BELOW REGULATORY CONCERN WASTE

Below Regulatory Concern Waste is an issue that was discussed in Element 1 of the Plan on pages 1-4 and 1-5.

BOARD POLICY CONCERNING RADIOACTIVE WASTE FACILITY TYPES AND ACCEPTABLE CONCENTRATION LEVELS

Page 61 of the legislative audit report of the Utah Department of Environmental Quality of December 1992, stated: "We recommend the Legislature to statutorily address the type and level of radioactive waste disposal facilities allowed to be licensed within the state of Utah.

Envirocare was established to be "Vitro-like", to receive materials similar to the Vitro uranium mill tailings which are already deposited on the site. These materials are typically low in radioactivity and were bulky, soil type materials. Over the years of operation, Envirocare has modified the radioactive license and has obtained or is working on other permits that will expand the scope of waste materials that Envirocare can receive in the future. For example, a hazardous waste permit was issued in 1989, that allows Envirocare to receive mixed waste (hazardous waste mixed with radioactive wastes). Envirocare also has received a license from the Nuclear Regulatory Commission to receive and dispose of uranium mill tailings. License amendments through the Division of Radiation Control have expanded the list of radioactive waste materials that could be received and well as the concentration. Envirocare is now licensed to receive the lowest classification of low-level radioactive waste (Class A).

The powers and duties of the Utah Radiation Control Board need to specify that a policy be established that deals with amendments by Envirocare beyond what is now allowed (specifically in expanding the scope of activities through license amendments relating to waste type and/or change of concentrations of radionuclides or adding radionuclides not currently in the inventory). Senate Bill 129, introduced and passed, during the 1994 legislative session clarifies the powers and duties of the Radiation Control Board to ensure that amendments are subject to a public process. In addition, on April 1, 1994, the Utah Radiation Control Board established by rulemaking the public comment rule. This rule will ensure that waste issues are adequately addressed in a public forum. Senate Bill 129 also recognized that new interim storage or decay in storage facilities must meet the current siting criteria as well as be subject to legislative and gubernatorial approval. In addition, new or amended licensees wishing to accept Class B and/or C low level waste must obtain legislative and gubernatorial approval.

ACTIONS BY OTHER STATES OR THE FEDERAL GOVERNMENT THAT IMPACT UTAH'S MANAGEMENT OF RADIOACTIVE WASTES

Since the responsibility of uranium mill tailings management in Utah is a federal government responsibility, occasionally actions occur as the result of federal government action that may have an impact on responsible waste radioactive waste management in Utah. NRC's philosophy on management of uranium mill tailings is, whenever possible, to combine smaller tailings piles into larger one. Uranium mills have been licensed by NRC to receive tailings from smaller in-situ mining operations whereby the tailings are directly disposed of in existing tailings ponds at the receiving facility. Uranium mills have also been licensed by NRC to receive materials that contain high levels of uranium that can be processed for uranium recovery. Typically these materials contain a high level of recoverable uranium making it feasible for re-processing. Controversy often results when these materials are received into Utah from out

of state sources. While there is no prohibition of this activity, the issue of interstate transportation of waste and waste equity becomes a question.

The State of Utah has been active and will continue to be active in raising concerns over NRC decisions relating to uranium mill tailings remediation. The recent Atlas uranium mill decision by NRC to approve an on-site reclamation plan and issue a finding of no significant impact for the related environmental impacts spurred several agencies, including DRC to challenge the action. As a result of the DRC challenge, NRC decided to renew the Environmental Impact Statement process.

DRC was concerned about receipt of information from NRC regarding actions at uranium mills in the state. DRC now has established communication lines with NRC including monthly conference calls and receipt of all correspondence involving Utah activities. This will allow for involvement of DRC early on in the process regarding items such as review of reclamation plans, license amendments involving materials to be reprocessed or for disposal, groundwater issues, and surety updates. DRC has also notified NRC that inspectors from DRC will accompany the NRC during the inspection of uranium mill facilities to ensure DRC is familiar with issues relating to these facilities.

DRC has also championed public participation concerns raised by licensing actions at the Umetco White Mesa mill which allowed them to receive uranium mill tailings from off-site for disposal or reprocessing. DRC objected to the public participation process for these actions and as a result, DRC will be notified directly of licensing actions at Utah uranium mills. This will allow DRC to have prior notification of actions. All Utah uranium mill license actions will be published in the Federal Register which will allow upfront hearing requests. In addition, NRC will publish a notice of final action which will allow challenge by any party of the decision on an administrative basis. Although these actions are not perfect because of the limited access to members of the public to the Federal Register, they are a step forward for Utah input into important Utah issues under the control of the Nuclear Regulatory Commission.

Another recent action has been the licensing of the Uravan site by the state of Colorado (have primacy for the uranium mill tailings programs) and the decision to allow Uravan to receive additional materials for disposal at the site. This site is approimxately 16 air miles from the Utah border and about 30 miles upstream from the Utah border. During the 1994 legislative session, House Concurrent Resolution 13 established a process to address this issue. DRC will be preparing a technical report as well as participating in a coalition of Utah and Colorado legislators, industry representatives, and members of the public to address the problem. As necessary, the state of Utah will work through the regulatory process with NRC to ensure that sound decisions are made in relation to uranium mill tailings disposal actions in and adjacent to the State of Utah. Where appropriate, DRC will work closely with NRC to resolve issues of mutual interest or will challenge NRC actions that are not protective of human health and the environment. In addition, the Executive Secretary will keep the Utah Radiation Control Board members informed of licensing issues relating to uranium mills within the State of Utah.

APPENDIX A

This appendix consists of written comments received for the Draft State of Utah Radioactive Waste Management Plan. The letters submitted and action taken are as follows:

U.S. Nuclear Regulatory Commission - Incorporated

Gene M. Stevenson - Nonincorporated

UMETCO Minerals Corporation - Incorporated

Envirocare of Utah, Inc. - Nonincorporated

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 10, 1994

Mr. William J. Sinclair
Executive Secretary
Utah Radiation Control Board
168 North 1950 West
P.O. Box 144850
Salt Lake City, UT 84114-4850

Dear Mr. Sinclair:

Thank you for the opportunity to comment on the State of Utah's draft Radioactive Waste Management Plan (Plan). We apologize for not being able to meet the January 18, 1994 comment deadline but, from conversations with your staff, we understand that our comments will still be accepted.

NRC's staff review was limited to evaluating the Plan for accuracy of statements and compatibility with NRC's regulatory practice and regulations. It did not extend to an examination of the provisions in the State's Radiation Control Act.

Overall, the NRC staff found the Plan to be concise and well written with definitions that promote a good understanding of the elements that are intended to be addressed. They noted, however, that the stated purpose of the "Forward" and "Elements" sections does not appear to be met in the ensuing body of the report (i.e., the Plan does not present explicit evaluations or recommendations to be followed by the State, for example, there is no specific evaluation of waste treatment or disposal options or the establishment of specific waste reduction goals pertinent to the State).

The staff's more detailed comments are enclosed. If you have any questions or require additional clarification, please contact John J. Surmeier, Chief, Low-Level Waste Branch, Division of Low-Level Waste Management and Decommissioning, Office of Nuclear Materials Safety and Safeguards. Mr. Surmeier may be reached at (301) 504-3785.

Again, thank you for the opportunity to review Utah's draft Plan.

Sincerely,

Richard L Bangart

Richard L. Bangart, Director
Office of State Programs

Enclosure:
As stated

REVIEW COMMENTS BY
DIVISION OF LOW-LEVEL WASTE MANAGEMENT AND DECOMMISSIONING
ON STATE OF UTAH RADIOACTIVE WASTE MANAGEMENT PLAN

1. (Page 1-2, 3rd paragraph). The definition of source material is not consistent with the definition of source material in the Atomic Energy Act of 1954 (AEA) or U.S. Nuclear Regulatory Commission's regulations. Also, the definition presented on page 1-2 appears incorrectly to place an upper concentration limit of 1/20 of one percent for uranium or thorium to be considered as source material. Suggest that the definition in the AEA or in NRC regulations be used. In addition, suggest deleting the last sentence to avoid confusion as to the origin of the term "byproduct material."

2. (Page 1-2, 4th paragraph). Reconsideration of the wording in the last sentence of the fourth paragraph is suggested because it appears to imply that the NRC's regulations require a specific type of waste packaging. There is flexibility in the selection of the type of waste packaging in NRC's regulations, as long as the requirement for a structurally stable waste form [61.56 (b)(1)] is met.

3. (Page 1-3, 1st and 4th paragraphs). The correct reference to 10 CFR Part 61 provisions for these paragraphs is 61.7 (b)(2), rather than 61.7 (b)(3).

4. (Page 1-4, 2nd paragraph). The definition of "mixed waste" is in error. Suggest revising the definition to "Mixed wastes are wastes that contain hazardous waste defined under the Resource Conservation and Recovery Act (RCRA) that also contain radioactive material subject to the AEA. RCRA defines hazardous waste as waste that is listed in 40 CFR 261 Subpart D, or waste that exhibits one of the characteristics listed in 40 CFR 261 Subpart C (corrosivity, reactivity, ignitability or toxicity)." These revisions better reflect the actual wastes that are considered mixed wastes.

5. (Page 1-4, 4th paragraph). The last sentence indicates that "Until recently, certain types of mixed wastes have been referred to as orphan wastes." It is unclear: 1) which wastes the statement refers to; and 2) the manner in which the situation concerning these wastes has recently changed. Suggest deleting this sentence, or revising it to reflect which mixed wastes are no longer "orphan wastes," and how these wastes are now being managed.

6. (Page 1-11, 2nd paragraph). Statements indicate that the Radiation Control Act defines low-level waste as waste containing only beta or gamma emitting radionuclides. Suggest that the definition be reviewed prior to finalization of the plan as this statement would appear to exclude alpha and neutron emitters from regulation as radioactive waste.

7. (Page 1-14, 1st paragraph). Suggest updating of last sentence in this paragraph to reflect that the NRC issued the license to dispose of uranium and thorium byproduct material [as defined by 11e(2)] on November 19, 1993.

8. (Page 2-9, 2nd paragraph). Suggest revising the later portion of the first sentence to "...hazardous wastes regulated under RCRA and PCBs regulated under the Toxic Substances Control Act (TSCA)." This revision better reflects which material is regulated under each Act.

9. (Page 3-4, 3rd paragraph). Suggest the initial part of the last sentence be revised to state, "The positive impact of polymer-solidified wastes are as follows: when properly produced and controlled, they can meet NRC requirements for a structurally stable waste form, they have ..."

10. (Page 3-4, 5th paragraph). The disadvantages of waste solidification with cement should include the chemical interaction with certain ingredients in the wastes that sometimes will prevent the successful stabilization of the waste form.

11. (Pages 3-7, 7th paragraph). Plaster is indicated to be one of the materials in the earthen cover over the above-ground vault. Plaster would not typically be used in cover systems, and perhaps the intent is to identify plastic membranes.

12. (Page 3-8, 3rd paragraph). To be consistent with NRC regulations in 10 CFR Part 61, this paragraph should be revised to clearly distinguish between structural stability requirements which are required for both Class B and C wastes for 300 years, and protection against inadvertent intrusion which is required for Class C wastes for up to 500 years.

13. (Page 4-3, items ix - xii). It appears that words are missing or misplaced from each of these items. Suggest that these sections be reviewed for clarity and revised as appropriate. Also, item "(4)" at the bottom of page 4-3 appears to distinguish between "land" and "ground" disposal. Suggest that this paragraph be revised to reflect the difference, if any, between these two types of disposal.

14. (Page 6-2, 6th paragraph). The correct name for the cited statute is the Low-Level Radioactive Waste *Policy* Act.

15. (Page 6-7, second to last paragraph). Statements indicate that EPA sets radiation standards under RCRA. This statement is in error as RCRA specifically excludes radioactive material subject to AEA authority from the definition of hazardous waste. EPA sets radiation standards under the authority of the AEA.

16. (Page 6-7, last paragraph). Suggest revising the first part of the first sentence to "EPA regulates the hazardous waste component of mixed waste...." This better reflects the regulatory responsibility of EPA for mixed waste.

17. (Page 6-8, 1st full sentence). This sentence states that mixed waste is the responsibility of NRC, EPA, and Utah. Since Utah is both an NRC Agreement State and an EPA mixed waste Authorized State, commercially generated mixed waste in Utah is the responsibility of the State of Utah for both the radioactive and hazardous waste components.

18. (Pages 6-9 through 6-11) The following additions or revisions are suggested for updating the discussions on the Atlas Uranium Mill Tailings Cleanup:

    a. (History, page 6-9, last bullet). Change "be accountable" to "reimburse the licensee".

    b. (Mill Decommissioning and Tailings Reclamation, page 6-9, third bullet). Add "mill tailings reclamation" before "plan".

    c. (Recent Developments, page 6-10, first bullet). Change "LLW and Decommission Branch" to "Low-Level Waste Management and Decommissioning Division".

    d. (Recent Developments, page 6-10, third bullet). Change "early November 1993" to "May 1994" and insert the word "final" before "schedule" on the third line.

    e. (Recent Developments, page 6-10, last bullet). Change this bullet to state "A meeting of the technical working group was held on October 26, 1993, in Denver, Colorado. Periodic public meetings are expected to be scheduled by the NRC as the review progresses; but specific dates have not yet been established."

JAN 1994

Gene M. Stevenson
P.O. Box 317
Bluff, Utah 84512

January 13, 1994

Mr. William J. Sinclair, Executive Secretary
Utah Radiation Control Board
168 North 1950 West
P.O. Box 144850
Salt Lake City, UT 84114-4850

RE: State of Utah Radioactive Waste Management Plan "Draft"

First let me introduce myself. I am a Utah resident and property owner, residing in Bluff. I am a professional registered geologist, and have conducted geological research in the Four Corners region for 21 years. Most of my work has been in oil and gas exploration, but has also included the energy minerals, including uranium exploration. On Wednesday, January 5, 1994 I attended a public hearing about this Plan in Monticello; the hearing chairman was Mr. John Holquist(sp?). Only two others beside myself were in attendance at the meeting.

My comments are somewhat specific to my part of the State, namely southeastern Utah. Much to my chagrin, I see that the State has little, if any, jurisdiction about what bothers me most- namely mill tailings. Since the State, or any state for that matter, has no jurisdiction on any NRC licensed facility, I find much of your efforts unacknowledged by the nuclear industry. Furthermore, I see an argument brewing between Envirocare and other operators in the State with respect as to who gets to store these wastes. Once again, politics rule, and the public suffers.

I find the Northwest Interstate Compact on Low-Level Radioactive Waste Management a sham, in that this compact is about to be broken by a uranium mill here in southeastern Utah, and we have been told there is nothing we can do. This bit of wisdom has come from your representative at last weeks meeting, by DOE, industry spokesmen, and inferred by the lack of response by Governor Leavitt. So, if a mill can accept radioactive waste from an out-of-state source (rumored to come from Texas), and that state does not belong to the Northwest Interstate Compact, then why all the paperwork ?? Refer to page 1-11 of this draft and you'll see that none of the three primary purposes outlined

are being followed by allowing this interstate transfer of waste into Utah from a non-compact state.

If you can't control, or at least have a voice in the decision-making process, the illegal transfer of radioactive waste into the State of Utah, then why are you so worried where to bury hospital and academias waste? Kind of sounds like you're trying to build the perfect dam, but have lost sight that the flood is on a different river. Where's your priorities? Where's the governor? He vetoed the MRS nuclear dump last year for the State, but now we are told that the NRC doesn't have to comply to any State regulations or "compacts."

As far as I'm concerned, this whole approach the State of Utah is embarking on is nothing more than a paper chase. Until the State can be included in federal agencies' decisions with regard to site selection and methods of cleanup, I feel you are wasting your time and my tax dollar.

Sincerely,

Gene M. Stevenson

Gene M. Stevenson

cc: Governor Mike Leavitt

Umetco Minerals Corporation

P.O. BOX 1029
GRAND JUNCTION, COLORADO 81502
(303) 248-7700

via Facsimile (801) 538-6128

January 18, 1994

Mr. William J. Sinclair
Executive Secretary
Utah Radiation Control Board
P.O. Box 144850
Salt Lake City, Utah 84114-4850

Re: Comments on the Utah Radioactive Waste Management Plan

Dear Mr. Sinclair:

Umetco has reviewed the above draft plan and has the following comments:

1) Under Element 3, the Board has not addressed one potentially important alternative to disposal: that of recycling for the recovery of uranium. While, as you have noted elsewhere, the State of Utah does not currently have jurisdiction over the uranium mills within its borders, recycling is an option to disposal and should be considered where appropriate.

2) Under Element 3, there is no mention of the fact that the White Mesa Mill is licensed by the USNRC to accept up to 10,000 cubic yards per year of in-situ wastes from any single source. This is current capacity within the borders of the State, and as we have discussed before, Umetco believes that it should be recognized as such. The facility is duly licensed, is currently in operation, has over 3.5 MM tons of 11e(2) wastes on site, and should be considered as an option for the disposal of off-site 11e(2) wastes from both within and from outside State borders.

3) Under Element 6 under the heading of "OPERATIONAL URANIUM MILLS", it is stated that the White Mesa mill is allowed to process 4,380 tons of ore on an annual basis. This line should read the White mesa mill

is allowed to produce up to 4,380 tons of uranium on an annual basis (NRC license condition No. 12).

4) Under Element 6, you characterize Uravan as "sitting on the border of Utah". In reality, the site is 16 air miles from the Utah border and about 30 miles up stream from the Utah border.

Umetco appreciates the opportunity to comment on the draft Plan. If we can be of further assistance, please give me a call at (303) 248-4113.

Regards,

Richard A. Van Horn
Director of Operations

Note: Faxed on Jan. 21, '94

ENVIROCARE OF UTA

THE SAFE ALTERNATIVE

January 21, 1994

William J. Sinclair
Director, Utah Division of Radiation Control
168 North 1950 West
P.O. Box 144850
Salt Lake City, Utah 84114-4850

Dear Mr. Sinclair:

Envirocare of Utah, Inc., (Envirocare) respectfully submits the enclosed comments on the Draft state of Utah Radioactive Waste Management Plan dated December 1993. Envirocare notes that a representative also attended the hearing on this document who made a statement at the hearing.

Should there be any questions with these comments, please contact me at 532-1330.

Sincerely,

Charles A. Judd

Charles A. Judd, P.E.
Envirocare of Utah, Inc.

Enclosure

46 WEST BROADWAY • SUITE 240 • SALT LAKE CITY, UTAH 84101 • TELEPHONE (801) 532-1330

ADDITIONAL COMMENTS ON THE
DRAFT
STATE OF UTAH
RADIOACTIVE WASTE
MANAGEMENT PLAN
DECEMBER 1993

Envirocare of Utah, Inc., (Envirocare) respectfully submits comments to Elements 4, 5, and 6 of the Draft State of Utah Radioactive Waste Management Plan, December 1993.

ELEMENT 4

Any proposed disposal site should be evaluated for compliance with the federal and State of Utah siting criteria and requirements whenever a commercial disposal activity is to take place. These criteria are very important for disposal activities and include many seismic standards, floodplain standards, and standards involving siting at or near certain geologic, archaeologic, wilderness, agricultural or recreational areas, near areas of drinking water, surface water or groundwater resources, near homes or residential areas, schools, churches, and historic structures, or areas designated as prohibited by cities or counties.

ELEMENT 5

Funding Alternatives

The issues of funding alternatives are complex and must be carefully evaluated. Issues of unfair or double taxation and the economic effects of such funding decisions must be carefully weighed. Since the issues of fees and taxes are dynamic with radioactive waste management statewide, the State of Utah should first establish policy and objectives for management before determining which alternative to use for funding. Such an approach would help eliminate alternatives which run counter to the policy and objectives set by the State of Utah.

It is obvious from Tables 5-1 and 5-2 that Envirocare already provides funding for more than its share of the costs of operation of DRC. The budget dilemma noted on page 5-2 seems to stem from the fact that disposal fees from Envirocare are, to some extent, subsidizing other licensees. Any increase in disposal fees should only be for the purpose of assuring that Envirocare pays its fair share of the cost of operation of the Department, if in fact an increase is needed for that purpose. If the overall budget shortfall is due to a general pattern of insufficient recovery of expenses through fee collection on all types of licenses, and if the decision is that fees will not be increased sufficiently to recover those costs, then the recommendation is to place all funds collected from related sources to fund DRC at a level to accomplish its mission.

Any of the funding alternatives considered for raising fees on radioactive waste disposal result in increased disposal costs for

generators. Access fees based on a flat "per-generator" rate would penalize small generators. "Per-shipment" fees are tantamount to an increased per-ton fee, but one which imposes higher fees on small generators and truck shipments.

As stated on page 5-8, "'fees' need to continue to be designated for radioactive waste supervision and must not be used for other purposes if DRC funding is to remain stable." With this consideration in mind, and considering that Envirocare already contributes its fair share for the purpose of "radioactive waste supervision," it seems that the main purpose of the calculations presented under "Potential Funds Generated Per Year" on page 5-8 is not in line with the overall purpose stated in the preceding paragraph.

ELEMENT 6

Monitored Retrievable Storage

Although, as in the case of licensing of 11e.(2), the State of Utah has no direct responsibility in this program, it would be advisable to develop a formal plan for tracking, evaluating and commenting on developments in studies on MRS.

Uranium Mining and Milling

While the industry is currently in decline, this may not be so in the future. Certain problems have already arisen which could probably have been better managed by the State of Utah than by the Federal government. Issues of State vs. Federal control of radioactive waste management, ground water protection and land use could be much better handled under the blanket of agreement-state status.

The DRC has demonstrated its ability to license and regulate a variety of facilities, including radioactive waste disposal. It certainly has the capability to expand its authority to uranium mining and milling. The process for licensing and permitting by the cognizant divisions of the Department of Environmental Quality in the case of Envirocare can be contrasted to the licensing of uranium mines and mills. This is not to say that NRC Licensing is lax -- the experience of Envirocare in obtaining its 11e(2) license is evidence of that -- but state-directed licensing and regulation provides for more pertinent input and review by the people of Utah. At the same time, it eliminates any questions about which agency has primacy over a particular segment of the environment. Notwithstanding this comment, the State of Utah should not pursue agreement-state status for 11e.(2) if such status would incur financial responsibility from environmental liability associated with prior practices.

In the case of amendments to an existing license, DRC is much better equipped to conduct its actions in concert with public information and public participation.

APPENDIX B

This appendix consists of oral comments made at the Public Hearing for the Draft State of Utah Radioactive Waste Management Plan. Oral comments were made by the following:

Vernon E. Andrews, representing Envirocare of Utah, Inc.

Steve Ericksen, representing Downwinders

Jared Bunn, representing Broken Arrow, Inc.

Leland J. Hogan, Member of the Utah Radiation Control Board and Tooele County Commissioner

STATEMENT OF HEARING OFFICER FOR PUBLIC HEARING

MINUTES FOR THE COMMENT ON DRAFT STATE OF UTAH RADIOACTIVE WASTE MANAGEMENT PLAN, HELD ON JANUARY 5, 1994, AT SAN JUAN COUNTY COURTHOUSE, 117 SOUTH MAIN, MONTICELLO, UTAH, AT 7:00 P.M.

Hearing Officer: John Hultquist

Board Member's Present

Guest

Gene Stevenson
Frank Fassey
Scott Schierman

PUBLIC HEARING:

The Public Hearing on the Comment on Draft State of Utah Radioactive Waste Management Plan convened at San Juan County Courthouse, Monticello, Utah. The meeting was called to order at 7:00 p.m. by the Hearing Officer John Hultquist. Mr. Hultquist welcomed those in attendance to the hearing. He asked if there were any comments on the draft, Gene Stevenson had told Mr. Hultquist that he would be making comments, although at this time he changed his mind and did not have any comments to make. Scott Schierman said he did have some comments to make, but that he would submit those in writing to the Division. There were no other oral comments.

The meeting adjourned at 7:55 p.m.

STATEMENT OF HEARING OFFICER
FOR PUBLIC HEARING

Comment on Draft State of Utah Radioactive Waste Management Plan

January 5, 1994

San Juan County Courthouse
117 South Main, Monticello, Utah
7 P.M.

Hearing Officer: John Hultquist

Ladies and Gentlemen, we call this hearing to order. This is a hearing to receive comments on the draft State of Utah Radioactive Waste Management Plan.

My name is John Hultquist. I am an Environmental Scientist with the Division of Radiation Control, Utah Department of Environmental Quality. Tonight I am representing the Utah Radiation Control Board as the hearing officer.

A public notice announcing the commencement of a thirty day public comment period was published in the December 17, 1993 issue of the Salt Lake Tribune and Deseret News. In addition, notices were also published in the Moab Times-Independent, the Tooele Transcript Bulletin, and the San Juan Record. Copies of the draft plan have been made available for examination at the offices of the Division of Radiation Control, 168 North 1950 West, Room 212, Salt Lake City, Utah, the Weber-Morgan District Health Department, 2570 Grant Avenue, Ogden, Utah; the Southeastern Utah District Health Department, 471 South Main, Suite 4, Moab, Utah; the Southeastern Utah District Health Department, Courthouse, Monticello, Utah; and the Tooele County Health Department, 47 South Main Street, Tooele, Utah.

Opportunity will be provided to any person desiring to participate in these hearings. Written statements dealing with the draft radioactive waste management plan must be received no later than 5:00 P.M. Tuesday, January 18, 1994 will be accepted for the record. If anyone desires to make an oral statement, please sign the form and leave it with me.

These proceedings are being recorded and a transcript of these proceedings will be available for public inspection from the Division of Radiation Control, Room 212.

This is an administrative hearing and as such there will be no cross examination of the witnesses.

Those who have questions to ask should state their names and direct their questions to me. I will then determine the appropriateness of the question and relay the question for response as appropriate. I ask that you confine your remarks to the matter at hand and limit them to 10 minutes or less. Comments that are not pertinent will be ruled out of order.

It is the policy of the Department of Environmental Quality that the hearing remain in session for at least one hour. If, during that hour, there comes a time when there is no one desiring to make a statement, the session will be recessed. At the end of the hour or longer, the hearing will be reconvened and the record reopened. The hearing will then be concluded after all those who desire to make a statement have done so.

We will now proceed to hear any statements.

If there are no additional comments, this hearing will be considered closed. Any additional written comments will be received until 5:00 p.m on January 18, 1994.

Adjourned at : p.m., January 5, 1994

DRAFT STATE OF UTAH
RADIOACTIVE WASTE MANAGEMENT PLAN
PUBLIC HEARING
ATTENDANCE LIST
JANUARY 5, 1994, 7 P.M.
SAN JUAN COUNTY COURTHOUSE

NAME	ADDRESS INCLUDING ZIP	REPRESENTING	COMMENT DURING HEARING (YES/NO)
		5of4	
Gene Stevenson	P.O. Box 317 Bluff UT 84512		~~Yes~~ NA
Frank Fossey	Lisbon Valley Moab UT 84532	Rio Algom Mining	No
Scott Ackerman	Box 582 Monticello 84535	Umetco Minerals	Yes*

* will include in written comments.

STATEMENT OF HEARING OFFICER FOR PUBLIC HEARING

MINUTES FOR THE COMMENT ON DRAFT STATE OF UTAH RADIOACTIVE WASTE MANAGEMENT PLAN, HELD ON JANUARY 5, 1994, ROOM 201, AIRPORT EAST BUSINESS BUILDING (REAR), 168 NORTH 1950 WEST, SALT LAKE CITY, UTAH AT 7:00 P.M.

Hearing Officer: William J. Sinclair

Board Member's Present

Staff Members Present

Ray Nelson

Guest

Vernon Andrews, Envirocare of Utah, Inc. (yes, will have comments)
Teresa Crockett
Steve Erickson, Downwinders (yes, will have comments)
Jay Warner
Dianne Wygant

PUBLIC HEARING:

The Public Hearing on the Comment on Draft State of Utah Radioactive Waste Management Plan convened at 168 North 1950 West, Conference Room 201, Salt Lake City, Utah. The meeting was called to order at 7:00 p.m. by the Hearing Officer William J. Sinclair. Mr. Sinclair welcomed the public to this hearing, he preceded to read "Statement of Hearing Officer For Public Hearing," attached is the statement.

After the statement was read Mr. Sinclair asked that those present wanting to come forward and make their statement or public comments were at this time welcome to proceed. Mr. Sinclair first called on Vernon E. Andrews, representing Envirocare of Utah, Inc., to step forward and make his statement. The following are his comments:

ORAL COMMENTS THOSE PRESENT (1 AND 2):

(1) VERNON E. ANDREWS, REPRESENTING ENVIROCARE OF UTAH, INC.

Thank you for this opportunity, I have a short statement. We have read the Draft Management Plan and will perhaps present written statements later. I have for your information a copy for you tonight (he submitted a written copy to Mr. Sinclair). Mr. Andrews stated his name as Vernon E. Andrews, Cooperative Radiation Safety Officer for Envirocare of Utah, Inc.

The Utah Department of Environmental Quality took an active role in NRC's licensing of Envirocare for 11.e (2) material disposal. Their active involvement with the NRC's licensing process created a dynamic relationship with the approval's of our state license amendment of ground water permit. The efforts of Utah Department of Environmental Quality 11.e (2) licensing also resulted in the completion of a comprehensive study of the proposed facility and in a draft of the application and license requirements, this assured that our 11.e (2) facility and operations are safe for human health and are protected of the environment. These measures resulted in a comprehensive review and evaluations of several state officials and provided for public involvement. Envirocare recently became aware of the licensing of new commercial disposal site for nuclear waste in Utah. Our review of the licensing process revealed that the regional office of the United States Nuclear Regulatory Commission (NRC) approved a disposal capacity of 600,000 tons at UMETCO facility in Utah. The approval to UMETCO, a subsidiary of Union Carbide, was executed without any input from the Utah Department of Environmental Quality (DEQ) or the public. Additionally, UMETCO's amendment was granted without preparation studies or environmental evaluation because the NRC regional office decided to exercise an exclusive authority to exempt the facility from these requirements. As a member of the regulatory disposal industry, in the State of Utah, we find the recent approval actions of the NRC regional office quite unusual and question the precedence for this kind of federal autonomy on this decision of such local dynamics. We encourage the administrators and policy makers in the State of Utah to become involved in environmental reviews of any request for new radioactive waste management facilities or modifications of existing licenses. Although this radioactive waste plan points out Utah is not an Agreement State for 11.e (2) material, Envirocare believes that DEQ should be actively involved in any waste licensing action to assure the same level of review and environmental protection as it provided for the 11.e (2) license recently issued to Envirocare. This concludes my statement, Thank you.

William J. Sinclair thanked Mr. Andrews and recognized Mr. Steve Ericksen, who wanted to make some comments. The following are Mr. Ericksen's comments:

(2) STEVE ERICKSON, REPRESENTING DOWNWINDERS

My name is Steve Erickson, I live in Salt Lake City and I represent Downwinders here, as I make my comments tonight. I want to thank the Division for having this opportunity to speak on these matters. We also reserve the right to submit in writing a more detailed statement. I really haven't prepared anything tonight just wanted to express a couple of concerns; one of which that has already been brought to the attention in this hearing by a representative of Envirocare, that is the UMETCO situation. We're certainly concerned about the precedent that facility might set for additional radioactive waste being disposed in the State of Utah. We have on-going concerns as well, about the State's potential risk from the URAVAN facility in Colorado and wish to see the state take every action within it's power, and do so aggressively to try to block the facility there because of problems with that proposal which could lead to downstream contamination which might effect Utah. We're glad to see in Element 6, that the plan will address waste transportation concerns while those risks might be relatively minor, they are still risks. It is a concern of ours that the Division be in the loop with other agencies that are studying the varies impacts including law enforcement officials, emergency response,

and others who are involved in the local, as well as state wide planning process for dealing with shipments from Idaho National Engineering Labs (INEL) to the Waste Isolation Pilot Plant (WIPP) and from other location's, potentially to Nevada's location if indeed that ever comes to pass.

We have some concerns about the incineration of radioactive materials in order to reduce volume while there are relatively small amounts of radiation involved in that, we need to make sure that we're doing that appropriately. We've seen too much incineration over the years that has been less-well regulated than we would be advocating in the long-term management plan. While we wouldn't reject the option of incineration of small quantities of medical waste etc., we would like to look at that more carefully. I'd only go into more detail in writing on those issues. Clearly, one of our largest concerns is the proposed MRS, the Goshute Tribe in their Skull Valley Band is interested in continuing the study. The latest is that they are still planning to pursue it. Information has come out from a variety of sources that private deals might be struck over this, given the fact that Congress is cutting off the public money support for Phase II-B studies to be continued to be on where they have gone so far. We are really concerned that the state, the issue of Phase II and beyond grants that the public be more involved. I've seen the information from the Mesqueleros and what they're studying and how they're involving the public in New Mexico and the MRS debate. They actually have a main street in Redoso, store front operation with a big sign in front that says any one wanting to know more information about the MRS, that people can come in and obtain this information, public hearings have been held, so there has been a great deal of public interest involvement there. Unfortunately here, unless you happen to know the players on the Goshute Band Site, it's impossible to obtain any information about what the Goshute's are actually doing with their studies. While there are newspaper articles and quotes from attorney's for the Goshute's, the studies have been done from their side. I've seen it, it's pretty superficial. I sense a severe lack of understanding of some of the nuances involved, and the overall MRS project. We need to somehow figure out a way to open up the process to the public. The Goshute's seem to be resigned to do this without public involvement, at least I've seen no interest in the part of the Band to hold hearings or to discuss in any detail the public involvement in a back and forth discussion. What their intent is, what they found so far, problems that they have encountered in looking at this option, we need to perhaps find a forum that the state might use. The Radiation Control Board might be one option to bring that forward. Perhaps public hearings in Tooele County also in this matter, but the fact that the Goshute's have this grant and pursue these continuing studies. I think it's important for the general public to know in more detail, than what has been made available thus far. A magneto of sort to bring this before the public for further review at this juncture I think is appropriate. While there are lot's of other things we'd like to look at and comment on in writing we'll do that later when we have a little more time to discuss it with the Division.

There's one last issue I'd like to discuss, there's very little information available about radioactive materials on Defense Department Installation's. In particular I'm concerned about depleted uranium (DU) on the Utah Test and Training Range (UTTR). We're pursuing a few angles now to try to find out just how much DU might be splattered in the desert, we don't know. We're certain that there is some, we also know that operations continue out there to clean up after exercises by the Air Force primarily, although allied nations and other military branches have certainly used the UTTR. DU is out there from various exercises, we're convinced, if that's true then where does it go when it's cleaned up? We really don't know and we think that's an issue that ought to be examined in this process, whether

or not it becomes a part of the plan, it's too soon to put it into a plan because we just don't have sufficient information, but I think it's important that we look at what kinds of radioactive materials are in the possession or on the lands of the military agencies that operate within the boundaries of our state, to determine whether or not, where the management of those fall, given the changes in the Federal Facilities Compliance Act, and act appropriately from there. It's more of a heads up than it is a request for anything specific for the Department to do. I think it would be something that we collectively need to look into. While the dangers of that radiation maybe somewhat remote, particularly given the remote locations of the installations and the ranges where these materials may have been deposited, it's none the less an issue of some importance and we ought to examine it. Hopefully, to be able to provide some additional information in that regard prior to the close of the comment period, at least we'll have some clue of where we're headed with it by then. Thanks for the opportunity Bill.

Mr. Sinclair continued with the meeting, he did not see any other individuals that wished to make a public comment at this time. He resolved to take a recess of the hearing and it is policy to stay there for an hour, in case anyone was late. At this time the hearing went into recess. Mr. Sinclair said if any other individuals came in he would assess their desire to comment right before 8:00 p.m. After they returned to the hearing, if anyone else wanted to make a comment then he would give them an opportunity to speak. If no one showed up he would then adjourn the meeting. The meeting went into recess.

After the recess Mr. Sinclair called the meeting to order. At this time he did not see any additional people that had come in late or anyone wishing to make any additional oral comments, as such he considered the hearing closed. As a reminder he wanted to stress that if any one wanted to make any additional written comments that they do so during regular business hours to DRC. He reminded them that they had until January 18, 1994, to present those to the Division.

The meeting adjourned at 8:00 p.m.

Written Comments Received by the Division from the Following:

(1) **Envirocare of Utah, Inc., Charles A. Judd**, Vice President, letter dated January 21, 1994, also copy faxed on January 21, 1994.

(2) **UMETCO Minerals Corporation, Richard A. Van Horn**, Director of Operations, letter dated January 18, 1994.

(3) **Gene M. Stevenson, on behalf of public from Bluff, Utah**, letter dated January 13, 1994.

(4) **USNRC/Washington D.C., Richard L. Bangart**, Director of Office of State Programs, letter dated February 10, 1994.

STATEMENT OF HEARING OFFICER
FOR PUBLIC HEARING

Comment on Draft State of Utah Radioactive Waste Management Plan

January 5, 1994

Room 201, Airport East Business Building (Rear)
168 North 1950 West, Salt Lake City, Utah
7 P.M.

Hearing Officer: Bill Sinclair

Ladies and Gentlemen, we call this hearing to order. This is a hearing to receive comments on the draft State of Utah Radioactive Waste Management Plan.

My name is Bill Sinclair. I am Executive Secretary of the Utah Radiation Control Board and tonight I am representing the Utah Radiation Control Board as the hearing officer.

A public notice announcing the commencement of a thirty day public comment period was published in the December 17, 1993 issue of the Salt Lake Tribune and Deseret News. In addition, notices were also published in the Moab Times-Independent, the Tooele Transcript Bulletin, and the San Juan Record. Copies of the draft plan have been made available for examination at the offices of the Division of Radiation Control, 168 North 1950 West, Room 212, Salt Lake City, Utah, the Weber-Morgan District Health Department, 2570 Grant Avenue, Ogden, Utah; the Southeastern Utah District Health Department, 471 South Main, Suite 4, Moab, Utah; the Southeastern Utah District Health Department, Courthouse, Monticello, Utah; and the Tooele County Health Department, 47 South Main Street, Tooele, Utah.

Opportunity will be provided to any person desiring to participate in these hearings. Written statements dealing with the draft radioactive waste management plan received no later than 5:00 P.M. Tuesday, January 18, 1994 will be accepted for the record. If anyone desires to make an oral statement, please sign the form and leave it with me.

These proceedings are being recorded and a transcript of these proceedings will be available for public inspection from the Division of Radiation Control, Room 212 of this building or the Division of Water Quality, Third Floor of the Martha Hughes Cannon Health Building.

This is an administrative hearing and as such there will be no cross examination of the witnesses. Those who have questions to ask should state their names and direct their questions to me. I will

then determine the appropriateness of the question and relay the question for response as appropriate. I ask that you confine your remarks to the matter at hand and limit them to 10 minutes or less. Comments that are not pertinent will be ruled out of order.

It is the policy of the Department of Environmental Quality that the hearing remain in session for at least one hour. If, during that hour, there comes a time when there is no one desiring to make a statement, the session will be recessed. At the end of the hour or longer, the hearing will be reconvened and the record reopened. The hearing will then be concluded after all those who desire to make a statement have done so.

We will now proceed to hear any statements.

If there are no additional comments, this hearing will be considered closed. Any additional written comments will be received until 5:00 p.m January 18, 1994.

Adjourned at : p.m., January 5, 1994

DRAFT STATE OF UTAH
RADIOACTIVE WASTE MANAGEMENT PLAN
PUBLIC HEARING
ATTENDANCE LIST
JANUARY 5, 1994, 7 P.M.
AIRPORT EAST BUSINESS BUILDING (REAR)

NAME	ADDRESS INCLUDING ZIP	REPRESENTING	COMMENT DURING HEARING (YES/NO)
VERNON ANDREWS	8838 S 3780 W W. JORDAN UT 84088	ENVIROCARE	Yes
Dianne Wygant	820 W. Fremont S.L.C., UT 84104		NO
JAY WARNER	1290 Cathedral Dr SLC 84116		no
Ray Nelson		DRC	No
Steve Erickson	961 E. 600 So. SLC, UT	Downwinders	Yes
Teresa Crockett	3645 S. Bountiful Blvd, Bountiful UT 84010		No

STATEMENT OF HEARING OFFICER FOR PUBLIC HEARING

MINUTES FOR THE COMMENT ON DRAFT STATE OF UTAH RADIOACTIVE WASTE MANAGEMENT PLAN, HELD ON JANUARY 6, 1994, AT TOOELE COUNTY COURTHOUSE, TOOELE, UTAH, AT 7:00 P.M.

Hearing Officer: Craig Jones

Board Member Present

Leland J. Hogan (yes, will have comments)

Guest

Jared Bunn (yes, will have comments)

PUBLIC HEARING:

The Public Hearing on the Comment on Draft State of Utah Radioactive Waste Management Plan convened at Tooele County Courthouse, Tooele, Utah. The meeting was called to order at 7:00 p.m. and Craig Jones welcomed the public. Mr. Jones introduced himself as the X-Ray Licensing Manager for the Division of Radiation Control of the Utah Department of Environmental Quality. He then read (see attached) the following "Statement of Hearing Officer For Public Hearing."

After the statement was read Mr. Jones asked that those present who wanted to make a statement could do so at this time, the following are their statements:

ORAL COMMENTS OF THOSE PRESENT AT THE MEETING (1 AND 2):

(1) JARED BUNN, REPRESENTING BROKEN ARROW INC., AFFILIATED WITH ENVIROCARE OF UTAH, INC. (AT THE WEST DESERT)

I would like to say a little bit about the safety procedures and practices that they follow out there and how stringent they are. We have found many instances where the practice and procedures are very in depth and keep us on our toes out there, all the time. I'd just like to commend the Division of Radiation Control Board on that, in keeping everyone that works out there safe. The employee's approximately 50 people out at the site, implied this. We just appreciate the work we're able to do for the radioactive waste that comes into Utah. Mr. Bunn did not have any written comments to submit at this time.

(2) LELAND J. HOGAN, MEMBER OF THE DIVISION OF RADIATION CONTROL BOARD AND ALSO COUNTY COMMISSIONER OF TOOELE COUNTY

I'm happy with the process that has been developed for the management of waste within the State of Utah. The safeguards that have been put into place on the citing of facilities that are cited within the State. The question that I raise at this point and time, would be about the following of those practices as sites are considered in other locations. That the stringent procedure that has been put in placed be followed consistently, with all applications that are filed with NRC (US Nuclear Regulatory Commission) or with the State of Utah. When an application is filed with the NRC that it be followed up on by the State of Utah in seeing to it that the criteria that has been met by sites that are already established also be met by those sites that are proposed to be established in the future. There have been for safety reasons, for political reasons, for many different reasons, these things that have been put into place, it's important that they be followed. I question or I would like just to be put in the record that the State needs to continue to be involved in applications that are filed with the NRC, such as the UMETCO site that has been in the news of recent. That the Radiation Control Board has not had a discussion about this, yet the NRC has already issued a permit to them is my understanding, at this point. The involvement of the other process that was put in place for the citing of those facilities, it's important that those things be followed. I brought up the question and I want it to be in the record so that we can follow through at some other given point and time, that's all I can say. I support the site that we have in our county. The people that are working there are doing a good job. I think I've stated that at other given times and other locations. The facility, as far as our Health Department, I've just checked with them as of recent to make sure of their acceptance as to what has been going on. There is acceptance there, as well as the State following State regulations that are put into place. We're happy with the facility and the citizens in our county have accepted our happiness as well.

Craig Jones thanked Mr. Hogan for his comments. Mr. Jones said that there were no other individuals to make any other oral comments, so he recessed the Hearing at 7:30 p.m. He said the Hearing would stay recessed until other individuals arrived and if they choose to make a comment the meeting would be opened again.

Mr. Jones waited until 8:20 p.m., there were no other individuals in the audience. He said the meeting had been in recess and given that there were no other individuals in the audience to provide comments the meeting was considered closed. He said that any additional written comments would be received until 5:00 p.m. on January 18, 1994.

Adjourned at 8:20 p.m., January 6, 1994.

STATEMENT OF HEARING OFFICER
FOR PUBLIC HEARING

Comment on Draft State of Utah Radioactive Waste Management Plan

January 6, 1994

Tooele County Courthouse
North Auditorium
47 South Main Street, Tooele, Utah
7 P.M.

Hearing Officer: Craig Jones

Ladies and Gentlemen, we call this hearing to order. This is a hearing to receive comments on the draft State of Utah Radioactive Waste Management Plan.

My name is Craig Jones. I am the X-Ray/Radioactive Materials Licensing Section Manager with the Division of Radiation Control, Utah Department of Environmental Quality. Tonight I am representing the Utah Radiation Control Board as the hearing officer.

A public notice announcing the commencement of a thirty day public comment period was published in the December 17, 1993 issue of the Salt Lake Tribune and Deseret News. In addition, notices were also published in the Moab Times-Independent, the Tooele Transcript Bulletin, and the San Juan Record. Copies of the draft plan have been made available for examination at the offices of the Division of Radiation Control, 168 North 1950 West, Room 212, Salt Lake City, Utah, the Weber-Morgan District Health Department, 2570 Grant Avenue, Ogden, Utah; the Southeastern Utah District Health Department, 471 South Main, Suite 4, Moab, Utah; the Southeastern Utah District Health Department, Courthouse, Monticello, Utah; and the Tooele County Health Department, 47 South Main Street, Tooele, Utah.

Opportunity will be provided to any person desiring to participate in these hearings. Written statements dealing with the draft radioactive waste management plan received no later than 5:00 P.M. Tuesday, January 18, 1994 will be accepted for the record. If anyone desires to make an oral statement, please sign the form and leave it with me.

These proceedings are being recorded and a transcript of these proceedings will be available for public inspection from the Division of Radiation Control, Room 212.

This is an administrative hearing and as such there will be no cross examination of the witnesses. Those who have questions to ask should state their names and direct their questions to me. I will then determine the appropriateness of the question and relay the question for response as appropriate. I ask that you confine your remarks to the matter at hand and limit them to 10 minutes or less. Comments that are not pertinent will be ruled out of order.

It is the policy of the Department of Environmental Quality that the hearing remain in session for at least one hour. If, during that hour, there comes a time when there is no one desiring to make a statement, the session will be recessed. At the end of the hour or longer, the hearing will be reconvened and the record reopened. The hearing will then be concluded after all those who desire to make a statement have done so.

We will now proceed to hear any statements.

If there are no additional comments, this hearing will be considered closed. Any additional written comments will be received until 5:00 p.m on January 18, 1994.

Adjourned at : p.m., January 6, 1994

DRAFT STATE OF UTAH
RADIOACTIVE WASTE MANAGEMENT PLAN
PUBLIC HEARING
ATTENDANCE LIST
JANUARY 6, 1994, 7 P.M.
TOOELE COUNTY COURTHOUSE

NAME	ADDRESS INCLUDING ZIP	REPRESENTING	COMMENT DURING HEARING (YES/NO)
JARED BUNN	231 So 1ST WEST TOOELE 84074	BROKEN ARROW	POSSIBLY
Leland Hogue	495 main Tooele ut 84074	Tooele County	Yes

STATEMENT OF HEARING OFFICER FOR PUBLIC HEARING

MINUTES FOR THE COMMENT ON DRAFT STATE OF UTAH RADIOACTIVE WASTE MANAGEMENT PLAN, HELD ON JANUARY 6, 1994, AT ST. BENEDICTS HOSPITAL, OGDEN, AT 7:00 P.M.

Hearing Officer: William J. Sinclair

Board Member's Present

Jess McKenzie, Ph.D.

Guest

Ray Jaffee

PUBLIC HEARING:

The Public Hearing on the Comment on Draft State of Utah Radioactive Waste Management Plan convened at St. Benedict's Hospital, Ogden, Utah. The meeting was called to order at 7:00 p.m. by the Hearing Officer William J. Sinclair. Mr. Sinclair welcomed the public and those in attendance to the hearing. Those that were present had no oral comments to make, Mr. Sinclair adjourned the meeting.

STATEMENT OF HEARING OFFICER
FOR PUBLIC HEARING

Comment on Draft State of Utah Radioactive Waste Management Plan

January 6, 1994

St. Benedict's Hospital, Oak Room
5475 South 500 East, Ogden, Utah
7 P.M.

Hearing Officer: Bill Sinclair

Ladies and Gentlemen, we call this hearing to order. This is a hearing to receive comments on the draft State of Utah Radioactive Waste Management Plan.

My name is Bill Sinclair. I am Executive Secretary of the Utah Radiation Control Board and tonight I am representing the Utah Radiation Control Board as the hearing officer.

A public notice announcing the commencement of a thirty day public comment period was published in the December 17, 1993 issue of the Salt Lake Tribune and Deseret News. In addition, notices were also published in the Moab Times-Independent, the Tooele Transcript Bulletin, and the San Juan Record. Copies of the draft plan have been made available for examination at the offices of the Division of Radiation Control, 168 North 1950 West, Room 212, Salt Lake City, Utah, the Weber-Morgan District Health Department, 2570 Grant Avenue, Ogden, Utah; the Southeastern Utah District Health Department, 471 South Main, Suite 4, Moab, Utah; the Southeastern Utah District Health Department, Courthouse, Monticello, Utah; and the Tooele County Health Department, 47 South Main Street, Tooele, Utah.

Opportunity will be provided to any person desiring to participate in these hearings. Written statements dealing with the draft radioactive waste management plan received no later than 5:00 P.M. Tuesday, January 18, 1994 will be accepted for the record. If anyone desires to make an oral statement, please sign the form and leave it with me.

These proceedings are being recorded and a transcript of these proceedings will be available for public inspection from the Division of Radiation Control, Room 212.

This is an administrative hearing and as such there will be no cross examination of the witnesses. Those who have questions to ask should state their names and direct their questions to me. I will then determine the appropriateness of the question and relay the question for response as

appropriate. I ask that you confine your remarks to the matter at hand and limit them to 10 minutes or less. Comments that are not pertinent will be ruled out of order.

It is the policy of the Department of Environmental Quality that the hearing remain in session for at least one hour. If, during that hour, there comes a time when there is no one desiring to make a statement, the session will be recessed. At the end of the hour or longer, the hearing will be reconvened and the record reopened. The hearing will then be concluded after all those who desire to make a statement have done so.

We will now proceed to hear any statements.

If there are no additional comments, this hearing will be considered closed. Any additional written comments will be received until 5:00 p.m January 18, 1994.

Adjourned at : p.m., January 6, 1994

DRAFT STATE OF UTAH
RADIOACTIVE WASTE MANAGEMENT PLAN
PUBLIC HEARING
ATTENDANCE LIST
JANUARY 6, 1994, 7 P.M.
ST. BENEDICTS HOSPITAL, OGDEN, UTAH

NAME	ADDRESS INCLUDING ZIP	REPRESENTING	COMMENT DURING HEARING (YES/NO)
Jess McKenzie	1578 Apache Way - Bru.		
Ray Jaffe	901 Canterbury Dr #104 Ogden 84404		No